# FLIGHT and The AIRCRAFT ENGINEER

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# *The Outlook*

## *General Wavell for India*

THE position of the R.A.F. in India is the antithesis of what it is (in peacetime) in Iraq and Aden. In the latter two areas the Air Officer Commanding is in supreme command over all British forces in the country, including units of the Army. In India, on the other hand, his Excellency the Commander-in-Chief (who is a member of the Executive Council, which is equivalent to the British Cabinet) is responsible for the defence of the country by land, and the A.O.C. of the R.A.F. units in the country is definitely under his orders. There have been rumours that the relations of the two Services in India have not always been quite ideal, soldiers at times being inclined to depreciate the power of bombing on the North-West Frontier (though they always value air reconnaissance), while some R.A.F. officers have held that if their bombers had been given a free hand they could have reduced the Pathan tribesmen to order more swiftly and more cheaply.

In General Wavell India is now getting a C.-in-C. who is a firm believer in the air, who recommends army officers to fly as part of their training, even in preference to hunting, and who has just given a pattern display in his African campaigns of how an army and its air partner ought to work together in harmony. He certainly had an ideal coadjutor in Air Chief Marshal Sir Arthur Longmore. In India, we may feel sure, Sir Archibald will ensure that the relations of the two Services leave nothing to be desired, and that in actual operations each plays its due part in relation to the other. There will be no danger that devotion to tradition will lead him to use one arm when the other, or a combination of the two, is more likely to give the best results. In saying this we are not suggesting that the relations of the two Services were not happy when General Auchinleck was Commander-in-Chief.

An appreciation of air power is very desirable in a C.-in-C. in India just now—at least it may be if the Germans succeed in overrunning Russia. Every great conqueror has had the ambition of conquering India. Napoleon failed to get within striking distance. Alexander reached the Punjab, but after winning one battle turned back. No doubt Hitler has similar ambitions of sitting in state at Delhi, but he is not yet within striking distance.

## *India's Part*

IT has lately come to light that during the outbreak of Rashid Ali in Iraq, Generals Wavell and Auchinleck met at Basra and had a discussion. No statement has been made about their conclusions, but it is legitimate to conclude that one result of it has been the advance of troops from India (not merely a part of the Indian Army, but part of the Army in India, which is a larger affair) from Iraq into Syria along the oil pipe line in the direction of Homs. It does not appear from the communiqués that it was this Indian contingent which has actually captured Palmyra, but evidently there has been co-operation, and probably a junction of the two forces. That columns from India and from Egypt should meet and fight together in Syria is a very striking event. It shows that British authorities can think in terms of Empire strategy, and concentrate forces from widely separated points on the circumfer-

ence, even without the employment of sea power. In fact, the mention of sea power recalls the way in which the German battleship *Bismarck* was caught and sunk after naval forces from Home waters, from the Mediterranean, and from far out in the Atlantic had converged upon her. The meeting of land forces from India and Egypt in Syria makes a parallel case.

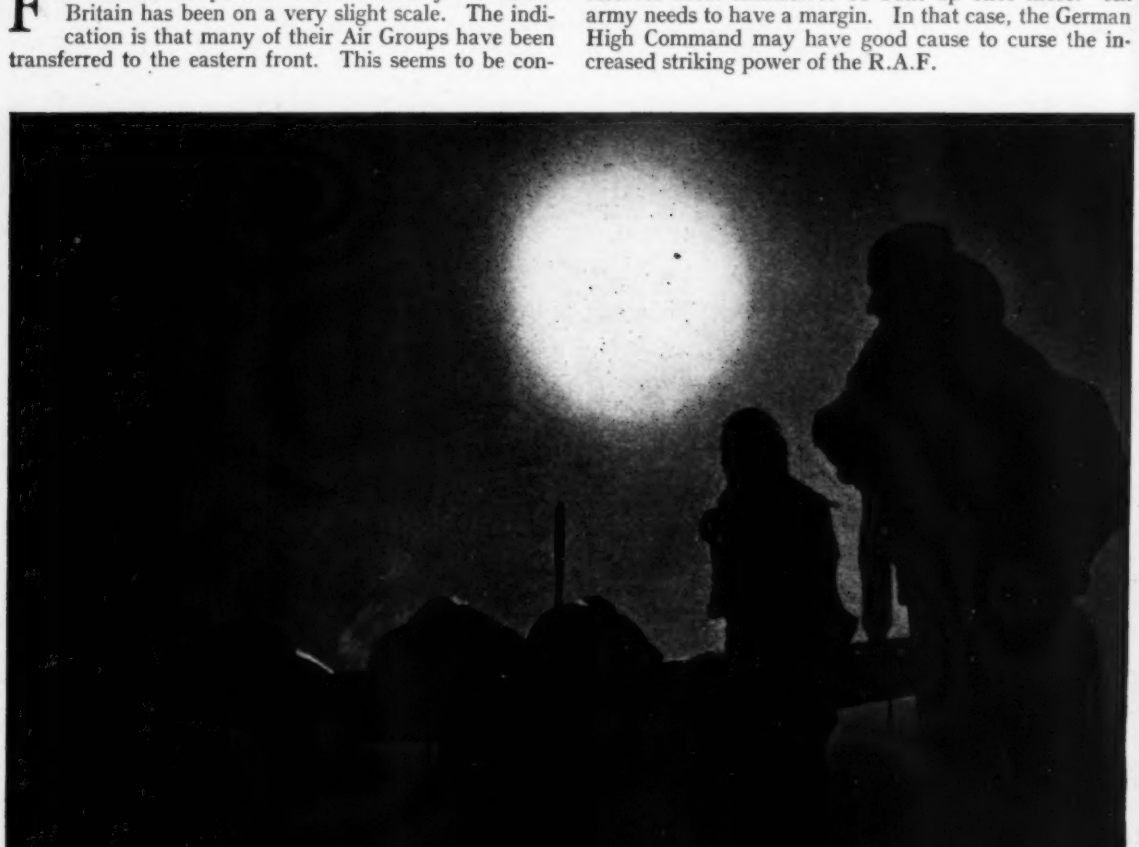
Air power is commonly said to be mobile, but that is only true when lines of bases have been prepared in advance. Fortunately, Syria and Iraq are both well off in that respect, and the capture of Palmyra aerodrome improves the British position in Syria. Naturally, the details of the concentration of British air power in Syria have not been made public. The R.A.F. in Iraq was probably—in fact, certainly—depleted some time ago by the calls made on it by the Middle East. When the Rashid Ali revolt broke out it had to be built up again, though we do not know from what source. Iraq is quiet now, and has probably been able to spare squadrons for Syria; though there has been no mention of aircraft accompanying the force advancing along the pipe line, that force must have had air support. Some skilful movements of air units have evidently been taking place.

## *The Eastern and Western Fronts*

FOR some weeks past German air activity over Great Britain has been on a very slight scale. The indication is that many of their Air Groups have been transferred to the eastern front. This seems to be confirmed by the reports of British fighter pilots, who say that on their daylight sweeps the Messerschmitts which they have met show a lack of skill, experience and aggressive spirit. Evidently the best pilots are not now in Northern France.

Recently the R.A.F. has intensified its attacks, and has been almost as active by day as by night. Some commentators have been led to say that the Germans are now fighting on two fronts—a notorious German nightmare. The expression is misleading, for the British air attacks have not led, and will not lead, the Germans to withdraw a single division of their army from the Eastern front. They evidently hope to overthrow Russia quickly and then turn their full strength against Britain. Before commencing the Russian adventure the Germans must have accumulated what they considered sufficient reserves of munitions without relying on further supplies from the factories in the Ruhr. As has often been pointed out in these columns, air attack on production does not produce quick results.

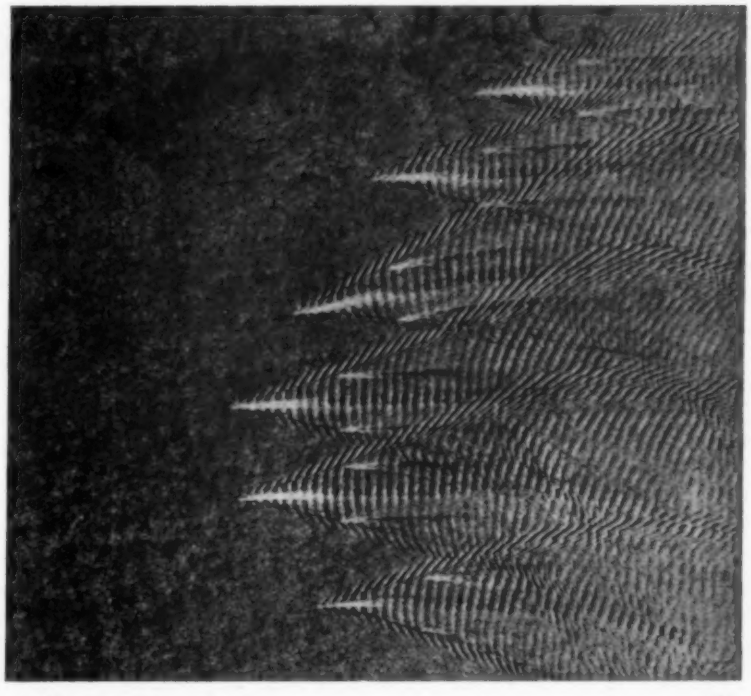
But the Russian army promises to remain a fighting force for much longer than the Germans reckoned that it would, and if that happens replenishment of munitions will presently become an urgent necessity. The reserve supplies will keep a firing line still firing, but reserves must themselves be built up once more. An army needs to have a margin. In that case, the German High Command may have good cause to curse the increased striking power of the R.A.F.



**MOONLIGHT IDYLL: A Beaufighter and its air crew silhouetted by the moon. When the *Luftwaffe* moves West again our night fighters with all their "devices" will be waiting to renew old acquaintances.**

# War in the Air

## *Stubborn Russian Resistance: R.A.F. Sweeps Day by Day with Escorts : Heavy Night Raids on Germany*



**DAZZLE PATTERN : The quaint effect on the water, as seen from a Coastal Command machine, of German minesweepers towing cable-cutting paravanes.**

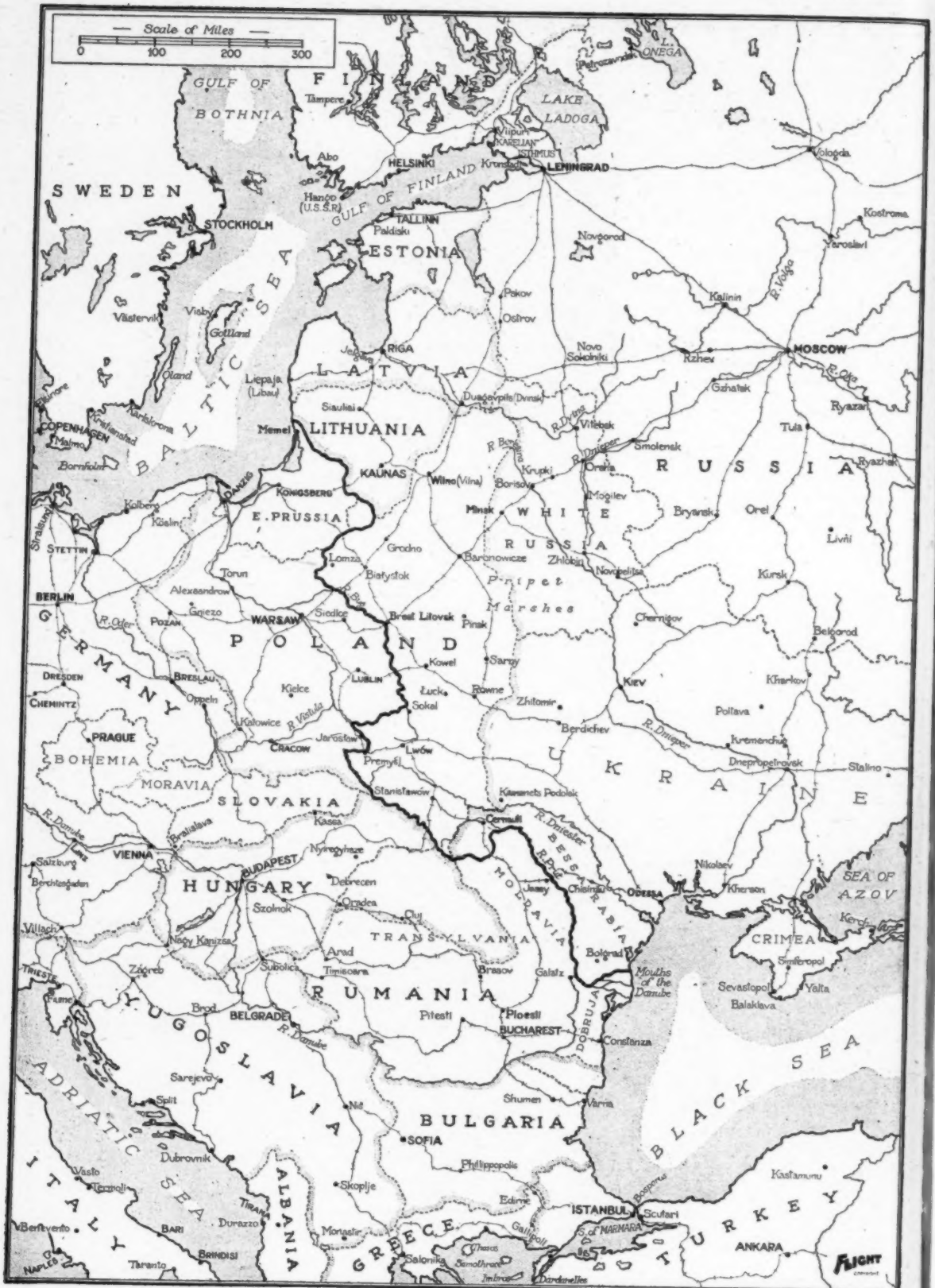
ACCURATE news from the front where the Germans and Russians are at death-grips is hard to come by, but it seems certain that the Russian troops and the Red Air Fleet started off with a more stubborn, and on the whole more successful, resistance than the Germans had expected. The *Luftwaffe* has by no means had it all its own way, and the Russian airmen showed a fine aggressive spirit. In a country where communications are bad, both sides have naturally been bombing the roads and rails behind the advanced troops of the other side, and both have been using aircraft to attack the tanks and other mechanised vehicles of the other. It has been mechanised war on a scale never previously witnessed. Both, however, use infantry to back up the advances of their tanks, and new tactics seem to be developing as each tries to prevent the opposing infantry from making contact with the armoured divisions in front of them. A new fighter, known as the I 18, has made its appearance on the Russian side, and in time we hope to learn something about it.

The Red Air Fleet has had plenty of practice on manœuvres in working with the Red Army (in which it resembles the *Luftwaffe*), but it has had little experience of actual warfare beyond the short campaign in Finland, when many Russian shortcomings were shown up. Some of them may have been made good in the meantime. The probability is that the organisation of the Red Air Fleet is not first class, and it has not got that experience of fighting which the Germans have acquired, and which is so very useful. In numbers of aircraft the Russians almost certainly have the advantage, and their pilots are known to be a tough and plucky lot, who are probably capable of standing up to a high rate of casualties without loss of *morale*. We must admit that the German airm also have this quality. The picture, therefore, is one of a powerful giant endowed with fiendish cleverness and full of the spirit of the machine, matched against a still larger Titan but one less clever, less trained, and only half-imbued with that genius for mechanics which means so much in modern war. But, in the past, no Power has ever succeeded in overrunning all Russia, and it ought to be impossible for the Germans to do so now. The Japanese beat the Russians in the early years of this century, and the Germans forced the Treaty of Brest-Litovsk on the Bolshevik Government just after it had seized power by a revolution and was only anxious to stop fighting at any cost. Both victors had only limited ambitions. But Hitler's invasion of Russia seems rather to resemble that of Napoleon, to aim at knocking out Russia as a great Power before turning with full force on the British Isles. If the Russian strategists are sound, they ought to be able to defeat that object even though they lose battles and have to vacate territory.

### A Spitfire's Duel

THE Germans have not denuded France and Northern Europe of aircraft, but they would naturally send some of their best over to the Russian front. One of their first objects in every campaign is to beat down the air arm of their opponents, an operation which calls for swarms of fighters as well as dive-bombers. One would expect the best Messerschmitt pilots to have gone to the East, and this probability is perhaps confirmed by the reports of some of the R.A.F. fighter pilots, who have said that during their daylight sweeps over Northern France they have found the German fighters not particularly anxious to engage them, and when they did attack that they were not always very skilful. Experienced leaders have been left in France, and the following story shows that the Spitfires do not always find a soft thing.

A Spitfire pilot who leads a famous Auxiliary Squadron with a brilliant record at Dunkirk and in the Battle of Britain recently had a battle of wits with the pilot of an Me 109F, Germany's newest fighter, over the Channel. The dog-fight took place off Dover when the squadron saw several Me 109F's flying above them. "I warned the squadron," said the leader's report, "and began a climbing turn. Telling the squadron to disperse so that the Germans could not see us all, I attempted to keep the Huns' attention as long as I could. One of the enemy came down, however, and attacked. I saw tracer bullets flying past. I climbed after the enemy. He climbed away from


Scale of Miles
0 100 200 300
GULF OF BOTHNIA
FINLAND
LAKE LADOGA
L. ONEGA
Tampere
Viipuri
KARELIAN ISTHMUS
Abo
HELSINKI
Kronstadt
LENINGRAD
Vologda
SWEDEN
Hangö (U.S.S.R.)
GULF OF FINLAND
STOCKHOLM
TALLINN
Paldiski
ESTONIA
Novgorod
Kostroma
Yaroslavl
Pskov
Kalinin
R. Volga
Visby
Gotland
Ostrov
Oland
RIGA
Nova Sokolniki
Rzhev
MOSCOW
Gzhatsk
R. Oka
Ryazan
LATVIA
Liepaja (Libau)
Dvinsk
Vitebsk
Tula
COPENHAGEN
Malmo
Memel
LITHUANIA
Smolensk
R. Dnieper
Ryazhsk
Bornholm
KAUNAS
Wilno (Vilna)
Orsha
RUSSIA
Kolberg
Kislin
KONIGSBERG
E. PRUSSIA
Mogilev
Minsk
WHITE
Bryansk
Orel
Livni
STETTIN
Lomza
Grodno
RUSSIA
Baranowicze
Zhlobin
Pripet Marshes
Kursk
BERLIN
Torun
Bialystok
Alexandrow
Gniezo
Siedlce
Brest Litovsk
Pinsk
Chernigov
Belgorod
GERMANY
R. Oder
POZAN
WARSAW
POLAND
Kowel
Sarny
DRESDEN
BRESLAU
Kielce
LUBLIN
Lutsk
Rovne
Kiev
Kharkov
CHEMNITZ
Oppeln
Sokal
Zhitomir
Poltava
Katowice
R. Vistula
Berdichev
PRAGUE
Jaroslaw
CRACOW
Lwow
R. Dniepr
Kremenchug
BOHEMIA
Premysl
Dnepropetrovsk
Stalino
MORAVIA
SLOVAKIA
Stanislawow
Kamenets Podolsk
UKRAINE
Kassa
Czernauti
R. Dniester
BESSARABIA
R. Danube
Bratislava
Nikolaev
VIENNA
Salzburg
Nyiregyhaza
SEA OF AZOV
BUDAPEST
Debrecen
Jassy
Chisinau
ODESSA
Kherson
Berchtesgaden
HUNGARY
Szolnok
Oradea
MOLDAVIA
Villach
Cluj
TRANSYLVANIA
CRIMEA
Nagy Kanizsa
Arad
Simferopol
TRIESTE
Zagreb
Subotica
Timisoara
Brassov
Galatz
Bolgrad
Mouths of the Danube
Sevastopol
Yalta
RUMANIA
FIUME
Brod
BELGRADE
Pitesti
Ploesti
BUCHAREST
Balaklava
YUGOSLAVIA
R. Danube
DOBRUJA
Constanza
BLACK SEA
Sarajevo
Split
Shumen
Varna
ADRIATIC SEA
Nis
BULGARIA
SOFIA
Dubrovnik
Philippopolis
Kastamuni
Vasto
Termoli
Skoplje
ALBANIA
Edirne
ISTANBUL
Scutari
Bosporus
TURKEY
ITALY
Benevento
Durazzo
TIRANA
BARI
Monastir
Gallipoli
S. of MARMARA
ANKARA
NAPLES
Taranto
BRINDISI
GREECE
Thasos
Salonika
Samothrace
Imbros
Dardanelles
FLIGHT

## WAR IN THE AIR

me." Then began a battle of wits. The R.A.F. pilot was determined to get his opponent to come down and attack him. For ten minutes jockeying for position went on, but "the enemy pilot, obviously very experienced, would not take any chances. Finally," said the Spitfire pilot, "I flew straight up sun and watched him very carefully. He turned about 1,000 feet above me and came round behind, but still would not attack. At last he dived, and the moment I thought his sights were on me I evaded him. As he shot past I got in a long burst. Bits flew off his machine, which turned on its back, smoking and diving vertically, and when I looked again I saw a splash in the sea."

The ideal tactics now would be for the Bomber Command to attack the rear of the German army, but that, unfortunately, is outside our range. Nor can we be sure that we are able to cut short the supplies which the German army needs. They must have piled up what munitions and stores they thought sufficient for the campaign before they started the invasion, and so would not be dependent on the daily output from the Ruhr and other factory areas. At least that must be the case, unless the Russians can hold them up long enough to upset their programme and exhaust the margin of supplies which they would have allowed.

### Range Limitations

BUT, with increased strength, the R.A.F. is certainly doing all it can to discommode the Germans in northern Europe. The daylight sweeps with strong escorts of fighters are not meeting with anything remotely resembling the opposition which the *Luftwaffe* met last year in the Battle of Britain. The mainly inexperienced fighter pilots of the Germans have suffered heavy losses whenever they have challenged our aircraft, and on numerous occasions the R.A.F. bombers have shot down or driven off Messerschmitts which have attacked them. Of course, the range for the daylight sweeps is limited by the fuel capacity of our short-range fighters, and likewise the scope of our night bombers is circumscribed by the shortness of the hours of darkness. But, when all is said and done, the R.A.F. is hitting the Germans hard and showing the French people that we have the aggressive spirit. There is welcome evidence, too, that our bombing of submarine bases has helped to diminish the volume of German attacks on our shipping out in the Atlantic.

**SOME WRIGGLER : A Flight Sergeant pilot inspects the damage received in a "party" with four Messerschmitts.**

The men who did so brilliantly in the Middle East are going elsewhere. Sir Arthur Longmore left not long ago, and now Sir Archibald Wavell has also made over his Command to a successor. It may yet come about that

**AMMUNITION, FUEL, OIL : Immediately a fighter lands from an operational flight, riggers, fitters, armourers and radio mechanics swarm over the machine to make it ready for service again. The photograph above is of a Spitfire on return from one of the recent daylight "sweeps." An Intelligence Officer is talking to the pilot.**

## WAR IN THE AIR

India needs the best soldier that Britain can find, but we all hope that things will not come to that pass. It will, we all hope, be left to General Auchinleck and Air Marshal Tedder to organise in due course the reconquest of Cyrenaica, and perhaps of Tripolitania as well. Everyone will hope that those two will work together as harmoniously as their two predecessors did. The latter left a fine record behind them, part of which is expressed in the following recently published figures.

### Six Months' Results

IN the first six months of 1941 Imperial Air Forces destroyed on the ground or shot down 1,453 aircraft in the course of operations in the Middle East. June was a particularly successful month, for the total number of enemy aircraft destroyed reached 210. This figure includes 55 Vichy aircraft destroyed in operations on the Syrian front.

During June there was again considerable activity in the Western Desert. Ground-strafing of advanced enemy aerodromes was one of the principal activities of our air forces, and 44 German aircraft were destroyed by this means. In addition, 43 enemy aircraft, the majority of them German, were shot down in aerial combat.

On June 17, when the recent fighting on the borders of Egypt and Libya was at its height, fighters of the R.A.F. and South African Air Force shot down twenty enemy aircraft.

Over Malta, attempts by Italian and German air forces to reconnoitre and raid the island met with scant success, and during the month 27 enemy aircraft were intercepted and shot down by our patrolling fighters.

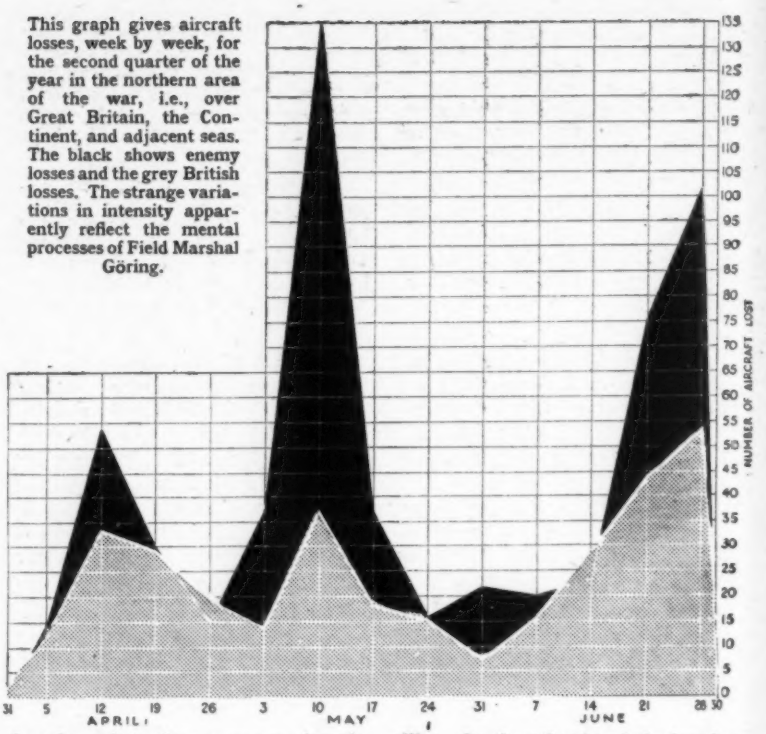
In Syria, the Royal Australian Air Force, equipped with the latest type of American fighter machines (Tomahawks have been officially mentioned), destroyed 31 Vichy aircraft in the course of ground-strafing operations, and a further 22 were shot down in air battles.

Although operations in Italian East Africa were practically at an end, 15 Italian aircraft were destroyed on the ground during the month. The remainder of the losses inflicted on the enemy consisted of aircraft destroyed on the ground in Crete, and of others shot down into the sea as our aircraft carried out protective patrols over naval ships during the evacuation of the island. Losses of the Imperial Air Forces in June amounted to 65 aircraft, but several crews and individual pilots were saved.

**ENEMY AIR LOSSES TO JULY 5th**

| | Over G.B. | Over Continent | Middle East |
|---|---|---|---|
| June 29 | 1 | — | 6 |
| ,, 30 | — | 8 | 5 |
| July 1 | — | 3 | 15 |
| ,, 2 | 3 | 22 | 4 |
| ,, 3 | 1 | 12 | 2 |
| ,, 4 | — | 16 | 3 |
| ,, 5 | 1 | 2 | 1 |
| Totals | 6 | 63 | 36 |

Total in Northern Area: 4,946. Middle East: over 1,917.




**This graph gives aircraft losses, week by week, for the second quarter of the year in the northern area of the war, i.e., over Great Britain, the Continent, and adjacent seas. The black shows enemy losses and the grey British losses. The strange variations in intensity apparently reflect the mental processes of Field Marshal Göring.**

A very welcome item of news has come from the Western front. It was stated some time ago that the Germans had destroyed the Canadian memorial on Vimy Ridge, which was unveiled some years ago by King Edward VIII. A Canadian fighter pilot on returning from a daylight sweep over France has said that he saw the memorial from 10,000 feet on a very clear evening and distinguished the two pylons. So far as he could see, the memorial appeared to be undamaged.

### In Syria

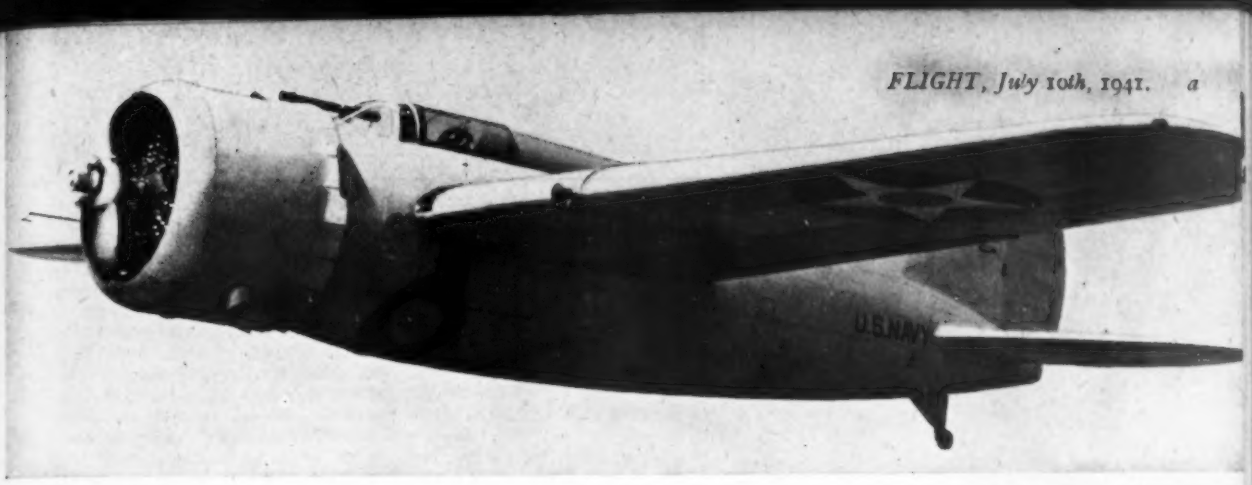
THE Allied advance in Syria is proceeding methodically, and great care is taken to do no avoidable damage to the French. A man who has returned from Beirut to Istanbul has reported that the port is bombed regularly every day by the R.A.F. with formations which vary from five to 20 machines. They have destroyed the oil installation and done much other heavy damage to the port. The A.A. guns always fire at the raiders, but this man said that the French gunners deliberately aim wide. This may be correct, but it is known that until A.A. gunners have had a good deal of experience of firing live shell at aircraft it is very easy for them to miss. But we must hope that it is true that the French are really imbued with friendly feelings for their recent allies. On the other hand the bombers do their utmost to avoid killing civilians or destroying private property. One British bomber which was about to make a low-flying attack on a military target saw a train approaching. The pilot broke off his attack while he signalled to the train driver to pull up at a safe distance. The latter was not slow to grasp the pilot's meaning, and obeyed. Many of the French prisoners have volunteered to join the Free French forces.

General de Gaulle has announced to the Syrians that the Allies intend to set up an independent Syrian State. The country was mandated territory, entrusted by the League of Nations to France, and as the Vichy Government cannot be regarded as representing the old victorious France, there are grounds for the view that the mandate is no longer valid. None the less, this step, which the British Government has sanctioned, gives an arguing point to Vichy, and so is of doubtful wisdom. A mandate is *de facto* not very different from sovereignty over a country, and Britain has disclaimed any intention of depriving France of any part of her Empire.

**BRITISH AIR LOSSES TO JULY 5th**

| | Over Fighters | Over G.B. Pilots | Over Continent Aircraft | Middle East Aircraft |
|---|---|---|---|---|
| June 29 | — | — | 11 | — |
| ,, 30 | — | — | 8 | 1 |
| July 1 | — | — | 5 | 2 |
| ,, 2 | — | — | 14 (1 pilot safe) | — |
| ,, 3 | — | — | 14 | 1 |
| ,, 4 | — | — | 8 | 2 |
| ,, 5 | — | — | 6 (1 pilot safe) | 3 |
| Totals | 0 | 0 | 66 | 9 |

Total in Northern Area: 2,170. Middle East: about 326.




The Brewster Bermuda two-seater dive-bomber now in production in America for the R.A.F. and F.A.A.

# DIVE BOMBING

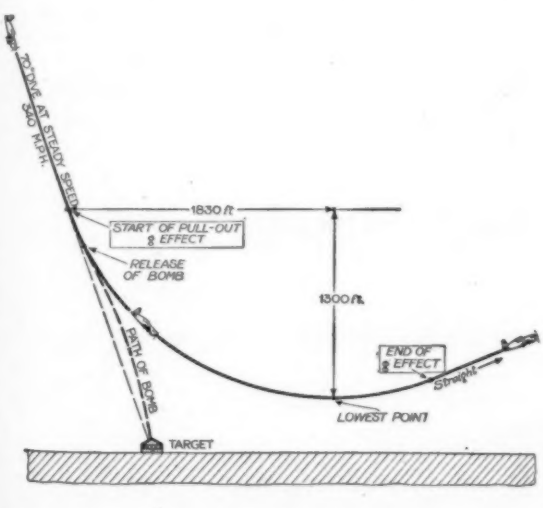
## *Factors Affecting Pilot and Machine*

DIVE bombing may be defined as the release of bombs when coming out of a dive at a target. There is only one exact position for release of the bomb because, unless the dive is at 90 deg. to the ground, the bomb does not travel in a straight path after it leaves the aeroplane. Although, as is obvious, different aircraft will dive at different speeds, it is generally assumed that the additional velocity imparted to the bomb is equal to dropping the same bomb in level flight 4,000ft. higher. This figure is, of course, for dive bombing from the usual heights. If the bombing were to take place from such a height that the terminal velocity of the bomb was reached, it would make no difference whether dive bombing or level bombing was employed.

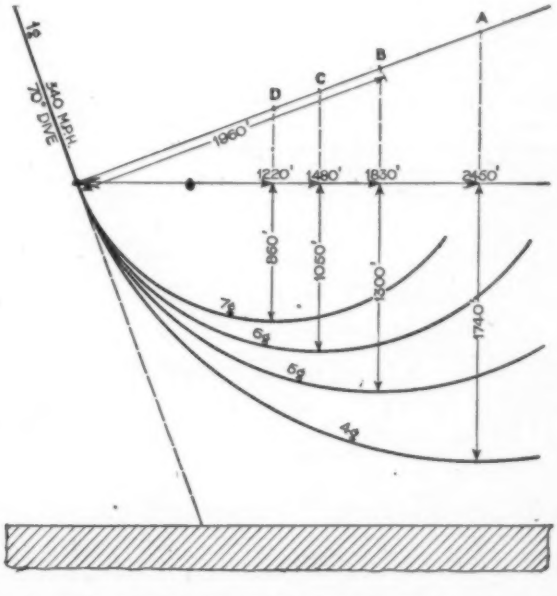
Modern dive bombers are going to descend faster than the 240 m.p.h. of the Stuka, probably 100 m.p.h. faster, and this speed of 340 m.p.h. and an angle of 70 deg. have been selected as the initial conditions in our diagrams. In the dive the aeroplane is aimed at the target and descends rapidly towards it. For maximum accuracy, the bomb should not be released in the straight dive, but its instant of release should be timed to occur just after the start of the pull-out, so that the curvature of the bomb's path will bring it right on to the target.

During the pull-out the aeroplane travels round the arc of a circle until it is again climbing, and after that makes good its escape. Its path in the pull-out is circular if the control column and throttle are worked to maintain a constant speed; naturally the radius of the circle can be increased or decreased by moving the stick forward or back as the pilot decides. Such movement of the stick varies the load factor, commonly referred to as the "g effect," which the pilot feels. With the stick farther back, the radius of the circle is smaller and the "g effect" greater. The curve shown is for an effect of "5g" while holding the same speed of 340 m.p.h. right round the curve. That is to say, the pilot's effective weight on the seat at the bottom of the pull-out curve is five times what it is in straight and unaccelerated flight. For such a factor, the descent is 1,300ft after starting the pull-out. Of course, if the diving speed is lower, the loss of height in recovery from the dive is very much reduced, and a Ju 87 Stuka diving at 240 m.p.h. at 70 deg. would only require 620ft. of vertical air space in which to pull out, with the same "g effect."

Four pull-out curves are also shown for different values of the "g effect." In addition to the 5g curve, one of larger radius and two of smaller radii are shown. These curves are arcs of circles with centres at the points A, B, C, D. From centre B, for the "5g effect," the circle has a radius of




In this diagram is shown the paths of the aircraft and the bomb in a 340 m.p.h. 70-degree dive with a 5g. pull-out.




A graph showing the height loss and the "g effect" experienced in pull-outs of different radii.

# DIVE BOMBING

The Junkers Ju 87 (Stuka) going down at a steep angle. An ejector arm throws the bomb clear of the airscrew.

1,960ft. The vertical descent is, of course, less than this figure because of the initial inclination of the straight dive. If the dive were vertical the descent in the pull-out would be equal to the radius of curvature.

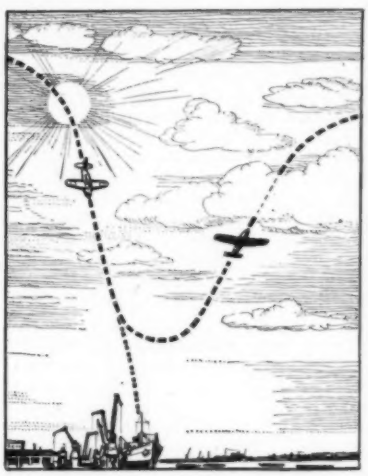
Excessive speed in the dive is prevented by the use of diving brakes; these are flaps under the wings made to project into the wind and so cause resistance. The Skua's diving brakes are "solid"; the Ju. 88 has brakes of parallel slats with spaces between them, and the Brewster Bermuda has fretted plates. The effect sought after in the two latter types is to "smooth" the air resistance of the brake and prevent it setting up large aerodynamic vibrations.

### Blacking-out

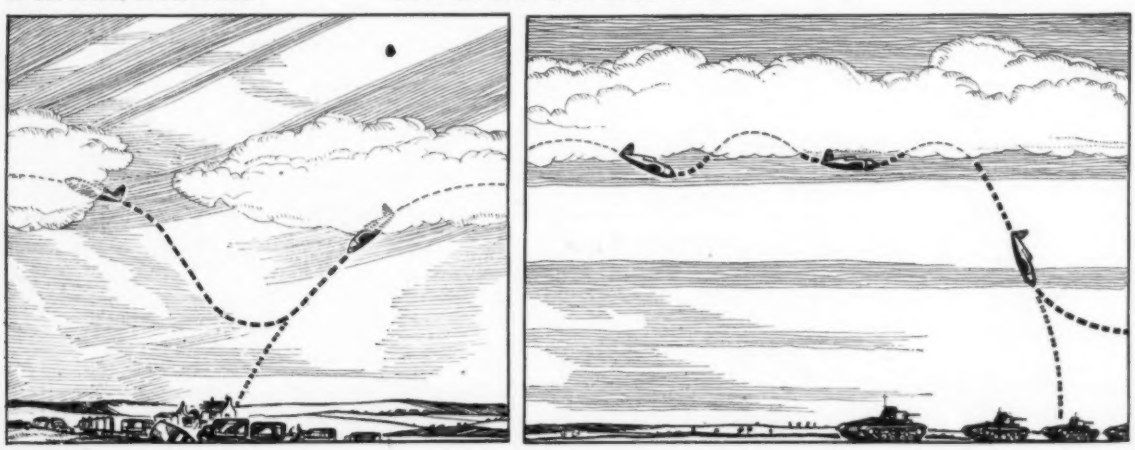
A pull-out with a very small descent is desired so that the dive bomber may go as low as possible before releasing the bomb, which, of course, helps accuracy. But a sudden pull-out means a high value of the load factor and this may break the aeroplane or the pilot. A "g effect" of about 10 would pull the wings off the bomber and would also probably seriously injure the internal structure of the pilot by tearing the lungs and other soft parts away from the bony structure of the body. So there are definite limits to the "g effect" in the pull-out, and probably five is about the maximum that could be used. At higher values than this the "blacking-out" of the pilot's sight would probably be so severe that he would be unable to continue flying.

The effect on the pilot of pulling out of a dive at, say, 5g, is to force the blood down the blood-vessels towards the feet, as if it weighed five times its normal weight, with the consequent draining from the regions above the heart. The blood-vessels being elastic, those below the heart swell under the extra pressure, increasing their capacity, and those above the heart contract. In the organs from which the blood has drained away owing to this circulation breakdown there is a deficiency of oxygen normally carried by the blood-stream. The brain and the eyes are obviously the organs affected most; darkening of vision occurs, and even unconsciousness if the accelerations continue. When accelerations, or "g," ease off, the eyes resume their function almost immediately, but unconsciousness persists — hence the reason for the automatic pull-out.

It is quite obvious that if the blood-vessels were inelastic, like metal pipes, and could not distend or collapse, the circulation would be unaffected because the blood could not drain away from any part of the body. It is impossible to support each vein separately, but a certain amount can be done by wearing bandages and belts. Any way of bolstering up internal



In favourable weather conditions, the attack should be made out of the sun and into cloud for getaway.



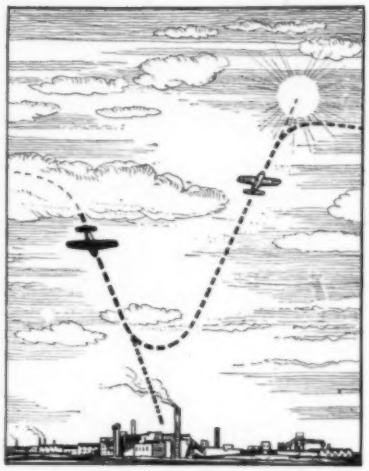
Diagrammatic illustrations of the use of varying cloud cover. On the left is broken cloud. The machine moves from one cloud to another, making the final dive between two clouds. A continuous layer is shown on the right. The machine comes out for short intervals to get its bearings before making the actual attack.

# DIVE BOMBING

pressure is effective. For instance, more "g" can be borne after a meal when the stomach is full.

Altering the attitude of the pilot can have a considerable effect on the "g" which can be borne without ill effect. It is inconvenient, to say the least, to depart from sitting as the standard position of the air crew. Standing upright gives the maximum effect. Sitting with the legs level or above the hips improves matters considerably, while in the horizontal position a large proportion of pilots could put up with as much as 10 or more "g" without losing consciousness. This, however, would be of little use, since the machine would probably break under the stress. The time element also enters into consideration but, generally speaking, the dive bomber pull-out is of such short duration that it can be more or less ignored.

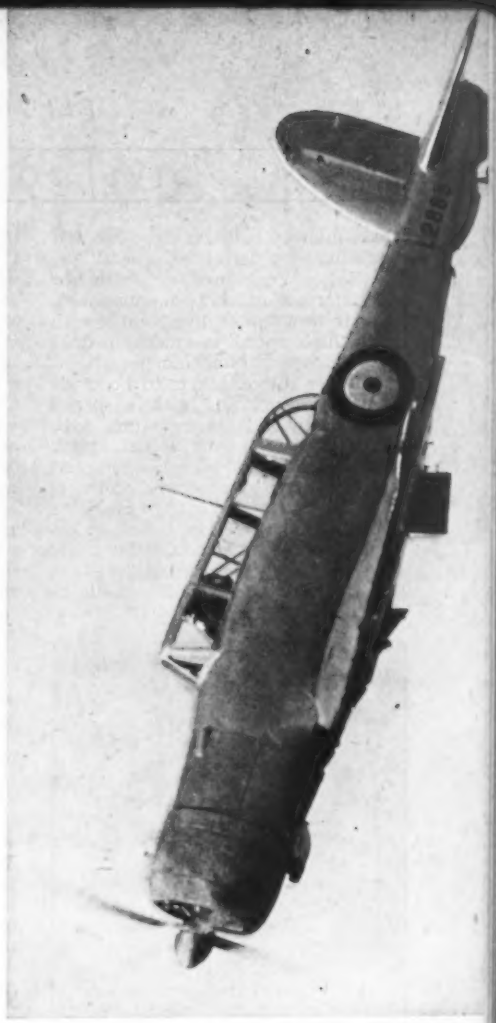
A dive bomber is no different from any other military vehicle and must be able to reach its target, do its job and return to its base. As with other military vehicles, there is a choice of three elements in making the approach and get-away reasonably possible. Cover by the skilful use of clouds, the sun and aerial manœuvre is the first aid to the dive bomber. Speed may be used to avoid interception by enemy fighters on the way to and from the target, and is, of course, a useful adjunct against ground defences. Finally, there is the time-honoured military system of fitting sufficient armament and armouring to enable the craft to fight its way to the target and out again. Weather conditions are out of the hands of man, and the use of clouds or other natural cover is a question of training crews to make the best use of the conditions prevailing at the time.



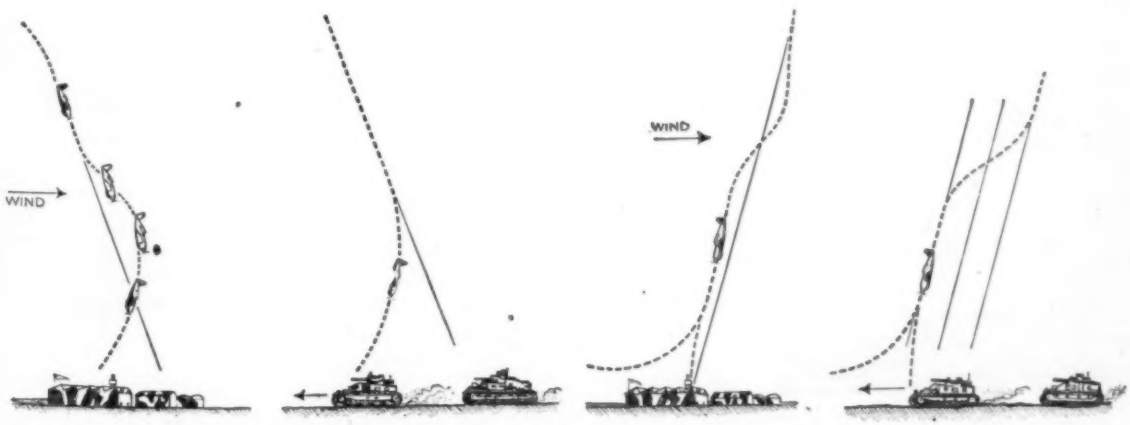
If the wind is in the wrong direction the reverse procedure can be made. Use the cloud for cover and the blinding effect of the sun for getaway.

## Aircraft Type

The other two elements must be taken into account in evolving what is considered the most suitable craft. Range, quality of opposing air force, money available, are but three of the many considerations which have to be taken into account when working out the compromise. Speed is expensive, and life in the German Army is cheap. Hence the Ju 87 has neither speed nor defensive armament, nor armour plate to protect the pilot, but we have never had the requisite number of fighters available to give them a really severe mauling and so the type has served its purpose. The Ju 88 has speed and armour-plating and better defensive armament and is, therefore, a much more formidable machine when used for attacking special targets. The Brewster Bermuda, which is now in production in America for the R.A.F. and F.A.A.,



Designed for shipboard work, the Blackburn Skua has folding wings and the diving brakes are "solid."

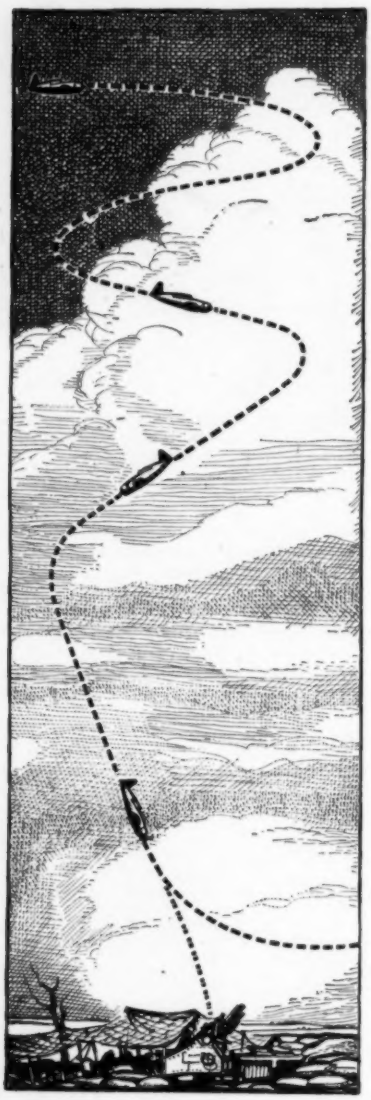



The effect of wind and movement of the target is shown here with the right and wrong methods of approach. (Left) Out-of-wind or against-target movement will steepen the dive to a dangerous degree. (Right) Into-wind or with-target movement will lessen the angle of dive and is easily allowed for.

# DIVE BOMBING

strikes midway between these two and should be very useful for general use. The Vultee Vengeance, of which but little information has been announced, seems to be a fighter-dive bomber with really high speed in addition to a heavy battery of machine-guns.

Whether the attack is to be made by a single machine with a special target or by a large formation with fighter protection, the actual attack becomes an individual operation. At this late stage the ground defences constitute the most formidable obstacle and, while the taking of extreme care in the aim must be a first consideration, every manœuvre and bit of cloud cover available should be put to good use.



If neither cloud nor sun is available to cloak the approach, aerobatics to put the ground gunners off their aim is the only subterfuge left to the dive-bombing pilot.

The time element enters largely into the approach problem, and every moment spent near the target means extra risk from A.A. fire. Height is also a consideration. Nine thousand feet gives reasonable security from light A.A. fire, but for the heavier guns at least 20,000ft. is necessary. On arrival at the scene of operations several factors have to be taken into account. Wind speed and direction; absence or otherwise of cloud cover; angle of sun to target and cloud cover; speed and direction of target; these are all factors in consideration of which the resulting dive is a compromise. No hard-and-fast rules can be laid down; the attacker must make the best use of prevailing circumstances. Wind measurements can be taken while on the approach in order further to reduce the time spent actually over the target.

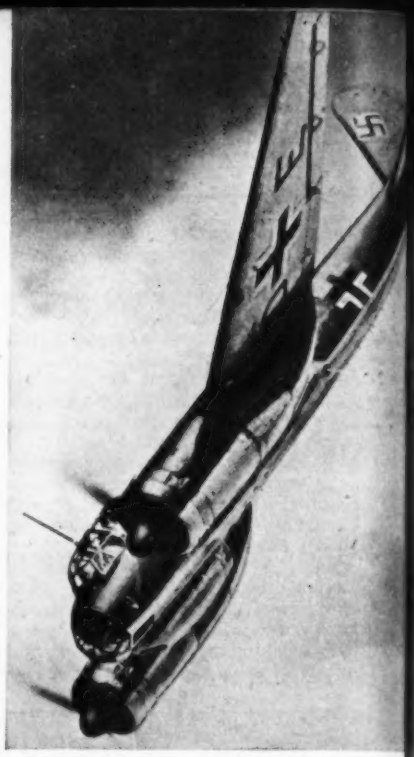
Theoretically, the vertical nose dive in still air should produce 100 per cent. bull's-eyes, and should also give the bomb the maximum velocity. In practice, of course, "still air" seldom happens. The natural endeavour by a pilot in a vertical dive with wind drift on is to keep his nose on the target. This leads to his machine getting beyond the vertical and makes it impossible to pull out of the dive before impact with the ground. With this in mind it is easy to realise that the 90 deg. dive requires the bombs to be released from a greater altitude, and this nullifies any advantage gained.

## Angle of Attack

Dives at 45 deg. to 70 deg. are coming to be the accepted angles of attack. Between these two figures simplicity of aiming still obtains without putting too great a strain on the air crews or the machines; neither is it necessary to fit the bomb on an ejector arm to miss the airscrew.

It is desirable to make the attack into wind and in the direction in which the target is moving, for the very good reason that the effect of both can easily be corrected during the final stages of the dive. The reverse direction would have the effect of steepening the dive to a dangerous angle. Nevertheless, if the target is large and well defended, the use of the blinding effect of the sun and available cloud cover will over-ride considerations of wind direction. Aiming is much the same as that employed for fixed forward-firing guns, and it is ordinary practice to paint marks on the cockpit windscreens in order that the proper angle to the ground can be checked off against the horizon. A dive is never as steep as it feels. A truly vertical dive gives the feeling of being well over on the back. The customary method of approach is to aim slightly behind or on the lee side of the target in order that the target may be kept in view the whole time and not hidden by the engine or other cowling. Release of the bomb is then made as the target appears to come gently downward through the sights.

The attack having been made, it is up to the pilot to make himself scarce as soon as possible. If there is backward-firing armament this may be used to quieten the ground defences, but accurate shooting is impossible of achievement until after the "g effect" of the pull-out from the dive has passed off. There are two means of evasion commonly used. The first is to keep low and zig-zag or crazy-fly the aircraft. This makes the pull-out a good deal gentler and puts the heavier A.A. guns off their mark. The second evasive action is to fly up into the nearest cloud or toward the sun, according to their actual position in relation to the getaway.



Without diving brakes the Junkers Ju 88—which is used for both level and dive bombing—has a maximum diving speed of 419 m.p.h.

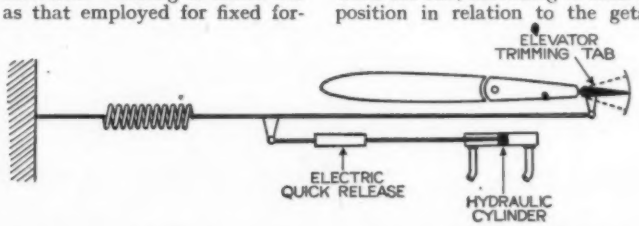
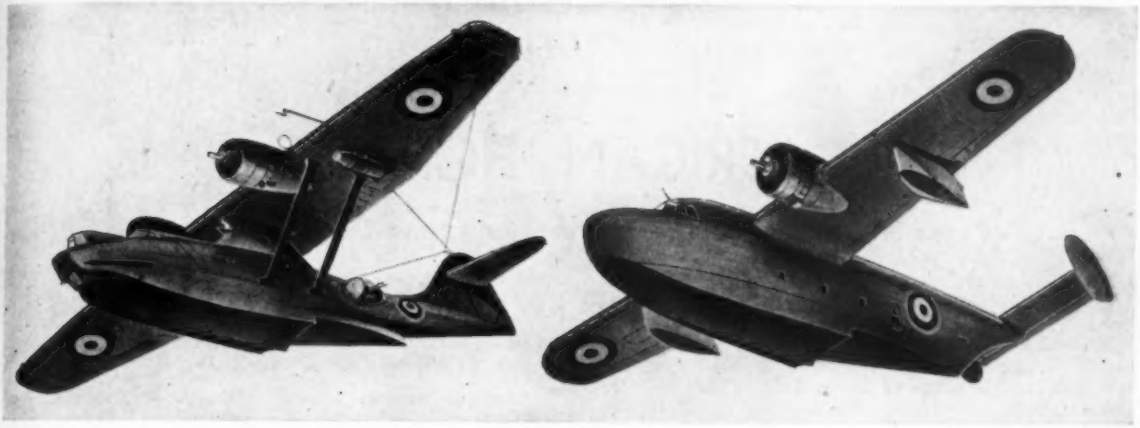



Diagram of automatic pull-out mechanism. Hydraulic pressure is applied to a piston which moves the servo tab to the dive position. Release of the bomb also releases the pressure and the spring operates the tab in the opposite direction.

*Twenty-seventh of the Series*

# FRIEND or FOE?

## *Two American Flying Boats : The Catalina and the Consolidated-31*



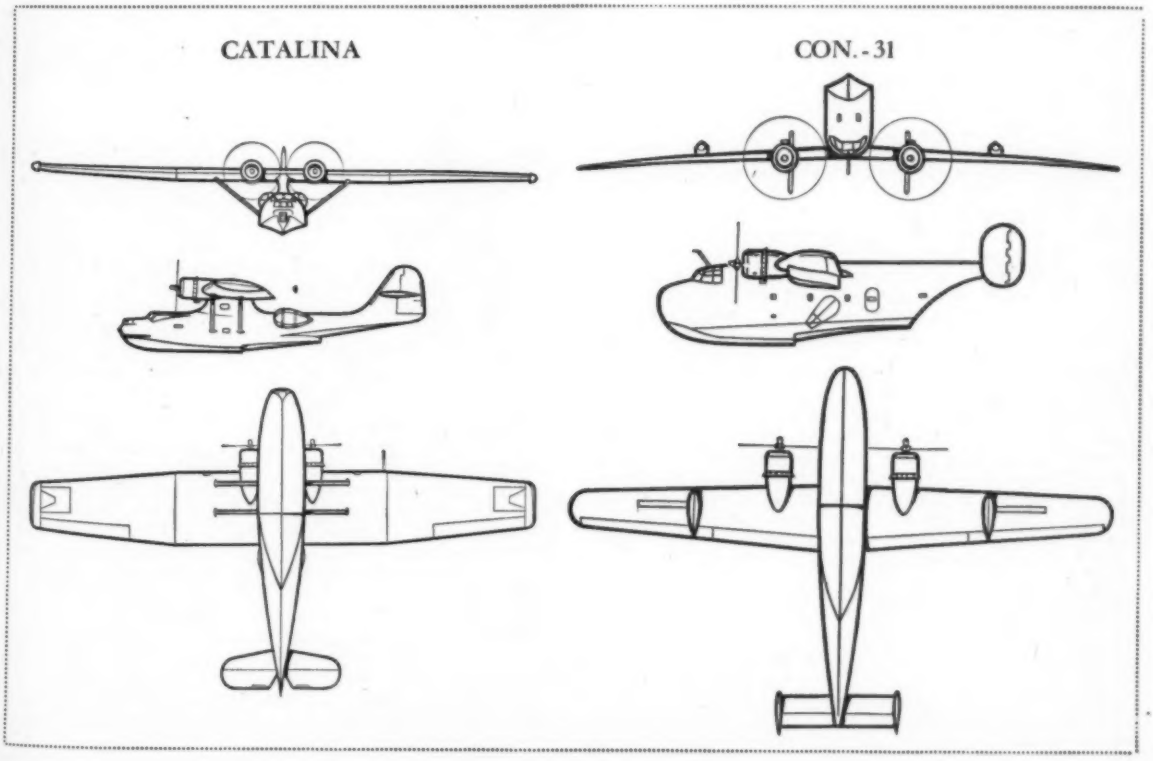
**Consolidated Catalina. Strut-braced pedestal wing ; both edges taper from centre-section to square tips. Twin radial engines. Gun blisters on slim hull. Tailplane set high on large single fin and rudder.**

**Consolidated-31. High cantilever wing tapers to rounded tips. Twin radials in short nacelles. Very deep hull with straight top-line. Oval outrigged twin fins and rudders Retractable wing floats fold inwards.**

ITS important part in the successful action against the Bismarck brought wide fame to the Catalina flying boat which is now doing admirable daily service with Coastal Command in ever-increasing numbers. Of the pedestal wing type, a notable feature of this boat is that the retractable wing-floats form the wing-tips when retracted. The wings are braced with double struts, the outer panels tapering on both edges to rather square-cut tips. With only two radial engines to feed and having a slim hull of low drag, the range of the Catalina is exceptionally good.

The tailplane, which is mounted high on the fin, has a backswept leading edge and is full cantilever, while the fin and rudder are large, having a gracefully curved leading edge and rounded apex and a slight outward slope down the trailing-edge. Clearly discernible on each flank is a streamlined gun "blister."

The Consolidated-31 is so different in general appear-



## FRIEND OR FOE?

ance that one would hardly imagine it came from the same stable as the Catalina. Its hull is narrow, but of exceptional depth (giving the whole aircraft a snub-nosed, tubby appearance from the side view), its high-wing is fully cantilever and it has twin oval fins and rudders outrigged on a rectangular tailplane of high aspect-ratio.

The top line of the hull is perfectly straight and level, and the tubby impression is further emphasised by the abrupt upsweep from the rear step to the tail. Actually the "31" is several feet longer than the Catalina; it is, in fact, a somewhat larger boat altogether. Its wings taper gracefully to rounded tips and mount two radial engines within oval cowlings. The wing-floats are retractable but remain visible, tucked up under the wings outboard of the engine nacelles.

*Next week:—The Bristol Beaufighter and the Lockheed Lightning.*

# AMERICAN FIGHTERS

### *Types Now Being Produced for the R.A.F. and the Fleet Air Arm*

SOME 20 different types of aircraft are now being produced for Great Britain under the Lease and Lend Act, many of which are already in service with the R.A.F. and the Fleet Air Arm. This week we publish details of eight single-seater fighters (illustrated opposite), and these will be followed by similar descriptions of four dive-bombers, two flying boats and six heavy bombers. In each case the American name or type number is given in brackets. All these American types are included, with abridged details of their chief external characteristics for the guidance of spotters, in the new *Flight* Identification Chart now on sale.

#### Single-seater Fighters

**Curtiss Tomahawk (P-40).**—Low-wing all-metal, semi-monocoque, stressed skin construction. Tapered wings have generous fillets at trailing-edge of roots. Cantilever tailplane. All control surfaces fabric covered. Allison 12-cyl. V-type liquid-cooled 1,000 h.p. engine and Curtiss electrically operated three-bladed airscrew. Large beard radiator under nose; small enclosed cockpit set well back. Undercarriage retracts backwards with fairings below leading-edge. Details of armament and performance not released but it is said to be one of the fastest in the world. Dimensions: Span, 37ft. 3in. Length, 31ft. 7in. Wing area, 236 sq. ft. Wing loading, 28.6 lb./sq. ft.

**Bell Caribou (Airacobra).**—Low-wing all-metal, stressed skin, built in two sections bolted together. Unusual design in that the 1,000 h.p. Allison engine is mounted amidships behind pilot's cockpit and drives a Curtiss electrically operated airscrew via a 96in. shaft and reduction gear box. Well-tapered wings set well back, pilot's cockpit above leading-edge. Cantilever tailplane, rudder and elevators fabric covered. Retractable tricycle undercarriage. Maximum speed, 400 m.p.h. at 15,000ft., cruising, 335 m.p.h. Service ceiling, 35,000ft. Range at cruising speed, 965 miles, but 1,250 miles at 250 m.p.h. Dimensions: Span, 34ft. Length, 29ft. 9in. Wing area, 213 sq. ft. Wing loading, 31.03 lb./sq. ft.

**North American Mustang (NA-73).**—Low-wing aluminium alloy monocoque built in two sections. Moderately tapered wings, metal covered with slotted trailing-edge flaps. Cantilever tailplane, rudder and elevators fabric covered, all having straight taper. Allison V-type engine giving 1,150 h.p. at 3,000 r.p.m. Hamilton three-bladed constant-speed airscrew. Hydraulically operated undercarriage retracts inwards. No performance details released. Dimensions: Span, 37ft. Length, 32ft. 3in. Wing area, 235.75 sq. ft. Wing loading, 32.5 lb./sq. ft.

**Curtiss Mohawk (Hawk 75A).**—Low-wing all-metal, semi-monocoque, stressed-skin construction. Hydraulically operated trailing-edge flaps. All control surfaces fabric covered. Retractable undercarriage and tail-wheel. Wings well tapered on trailing-edge with good fillets at roots. Undercarriage retracts backwards from trailing-edge with leg fairings as on Tomahawk. Wright Cyclone radial engine, 1,000 h.p. normal rating, 1,200 h.p. for take-off. Curtiss electrically operated airscrew. Top speed 323 m.p.h. Cruising, 262 m.p.h. Service ceiling, 32,700ft. Range at cruising speed, 1,003 miles. Dimensions: Span, 37ft. 3in. Length, 28ft. 8in. Wing area, 236 sq. ft. Wing loading, 24.3 lb./sq. ft.

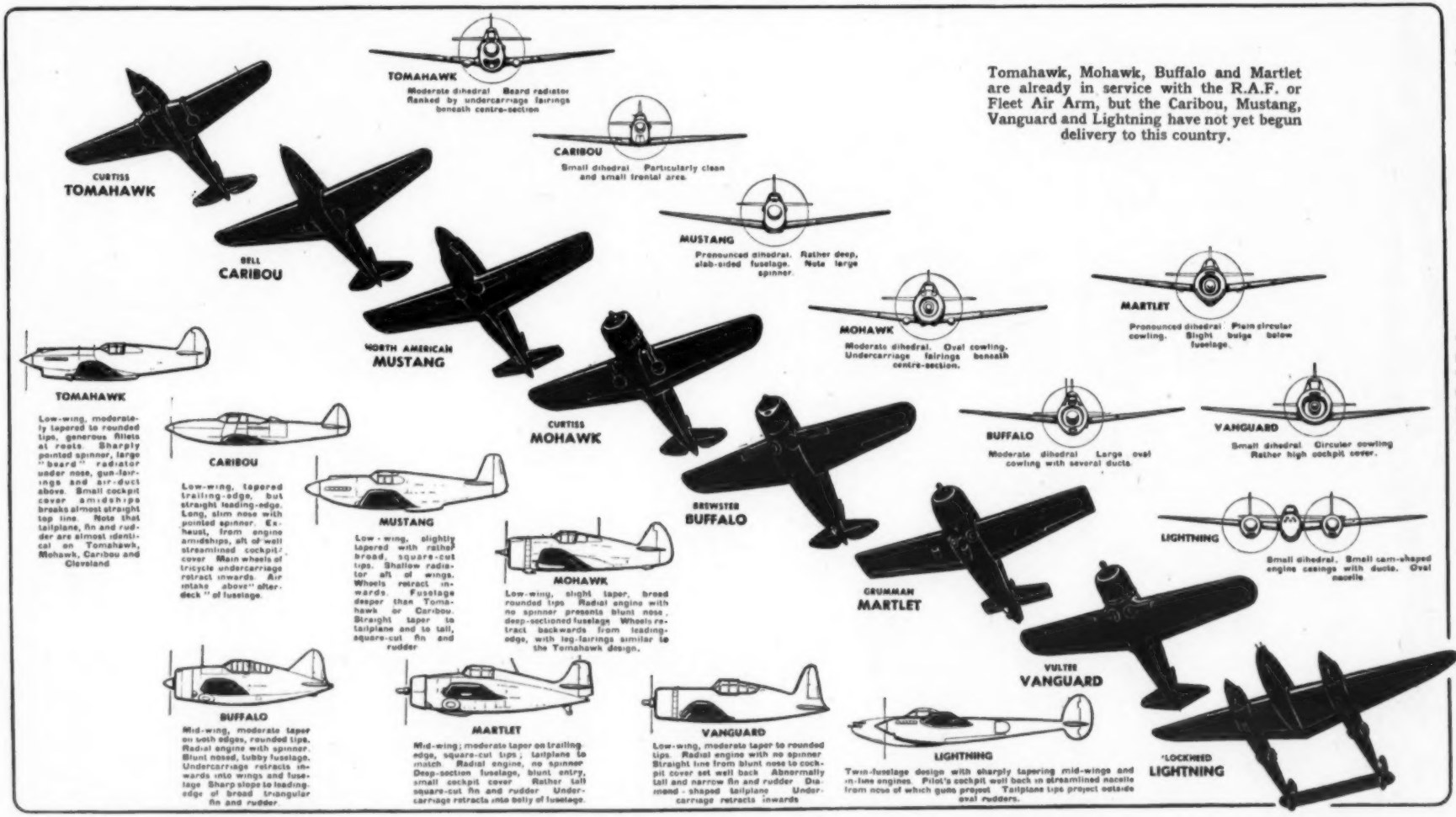
**Brewster Buffalo (Model 439).**—Mid-wing, all-metal (aluminium alloy) monocoque construction. Wings taper moderately to well-rounded tips; tubby fuselage with covered cockpit well back. Wright Cyclone G-205A radial engine rated at 1,000 h.p. and 1,200 h.p. for take-off. Hamilton hydromatic constant-speed airscrew with large spinner. Undercarriage legs retract inwards into wings, the wheels lying in recesses in the belly of the circular fuselage. Elevators and rudder are fabric covered. No performance figures have yet been released. Dimensions: Span, 35ft. Length, 25ft. 6in. Wing area, 224.2 sq. ft. Wing loading, 30 lb./sq. ft.

**Grumman Martlet (G-36A).**—Mid-wing of monospar cantilever type in aluminium alloy, flush riveted skin, monocoque fuselage of same alloy. All-metal tail group with elevators and rudder fabric covered. Slightly tapered square-tipped wings, no fillets; tapered, square-tipped tailplane. Wright Cyclone G-205A radial engine giving 1,200 h.p. for take-off. Undercarriage retracts into belly of tubby fuselage. No details of performance available but top speed reputed to be about the same as Hurricane. Dimensions: Span, 38ft. Length, 28ft. 10in. Wing area, 260 sq. ft. Wing loading, 22.6 lb./sq. ft.

**Vultee Vanguard (P-48C).**—Low-wing, all-metal cantilever with flaps; slight taper and round tips. Fuselage has a forward section of welded steel tubing with detachable metal panels and a semi-monocoque rear section. Tail control surfaces are fabric covered. Pratt & Whitney Twin Wasp radial engine rated at 1,050 h.p. normal and 1,200 h.p. for take-off. Hamilton hydromatic airscrew. The fin and rudder are of unusually high aspect ratio and have a small, rounded apex. Undercarriage retracts inwards. Maximum speed, 350 m.p.h. at 15,100ft. Cruising speed, 299 m.p.h. Service ceiling, 33,000ft. Normal cruising range, 700 miles. Dimensions: Span, 36ft. Length, 28ft. Wing area, 197 sq. ft. Wing loading, 31.4 lb./sq. ft.

**Lockheed Lightning (Model 332-61).**—Twin fuselage design, the pilot's cockpit being in a streamlined nacelle of semi-monocoque, stressed skin construction. The all-metal, cantilever wings taper sharply to very small tips and the tailplane is attached to the extremity of each fuselage and carries twin oval-shaped fins and rudders. An Allison V-type 1,090 h.p. engine is housed in the nose of each fuselage and drives a Hamilton hydromatic airscrew. Retractable tricycle undercarriage. Top speed is given as 404 m.p.h. at 16,000ft. and the cruising speed as 350 m.p.h. at the same altitude. Service ceiling is not stated, but a figure of 30,000ft. is quoted as absolute ceiling. The range at cruising speed with normal load is 600 miles and overload range, 1,070 miles. Dimensions: Span, 52ft. Length, 37ft. 10in. Wing area, 327.5 sq. ft. Wing loading, 43.9 lb./sq. ft.

# AMERICAN FIGHTERS IN THE R.A.F.


Tomahawk, Mohawk, Buffalo and Martlet are already in service with the R.A.F. or Fleet Air Arm, but the Caribou, Mustang, Vanguard and Lightning have not yet begun delivery to this country.
TOMAHAWK
Moderate dihedral. Beard radiator flanked by undercarriage fairings beneath centre-section
CARIBOU
Small dihedral. Particularly clean and small frontal area.
MUSTANG
Pronounced dihedral. Rather deep, slab-sided fuselage. Note large spinner.
MOHAWK
Moderate dihedral. Oval cowling. Undercarriage fairings beneath centre-section.
MARTLET
Pronounced dihedral. Plain circular cowling. Slight bulge below fuselage.
BUFFALO
Moderate dihedral. Large oval cowling with several ducts.
VANGUARD
Small dihedral. Circular cowling. Rather high cockpit cover.
LIGHTNING
Small dihedral. Small cam-shaped engine casings with ducts. Oval nacelle
CURTISS TOMAHAWK
BELL CARIBOU
NORTH AMERICAN MUSTANG
CURTISS MOHAWK
BREWSTER BUFFALO
GRUMMAN MARTLET
VULTEE VANGUARD
LOCKHEED LIGHTNING
TOMAHAWK
Low-wing, moderately tapered to rounded tips, generous fillets at roots. Sharply pointed spinner, large "beard" radiator under nose, gun-fairings and air-duct above. Small cockpit cover amidships breaks almost straight top line. Note that tailplane, fin and rudder are almost identical on Tomahawk, Mohawk, Caribou and Cleveland.
CARIBOU
Low-wing, tapered trailing-edge, but straight leading-edge. Long, slim nose with pointed spinner. Exhaust, from engine amidships, aft of well streamlined cockpit cover. Main wheels of tricycle undercarriage retract inwards. Air intake above "after-deck" of fuselage.
MUSTANG
Low-wing, slightly tapered with rather broad, square-cut tips. Shallow radiator aft of wings. Wheels retract inwards. Fuselage deeper than Tomahawk or Caribou. Straight taper to tailplane and to tall, square-cut fin and rudder.
MOHAWK
Low-wing, slight taper, broad rounded tips. Radial engine with no spinner presents blunt nose; deep-sectioned fuselage. Wheels retract backwards from leading-edge, with leg-fairings similar to the Tomahawk design.
BUFFALO
Mid-wing, moderate taper on both edges, rounded tips. Radial engine with spinner. Blunt nosed, tubby fuselage. Undercarriage retracts inwards into wings and fuselage. Sharp slope to leading-edge of broad triangular fin and rudder.
MARTLET
Mid-wing; moderate taper on trailing edge, square-cut tips; tailplane to match. Radial engine, no spinner. Deep-section fuselage, blunt entry, small cockpit cover. Rather tall square-cut fin and rudder. Undercarriage retracts into belly of fuselage.
VANGUARD
Low-wing, moderate taper to rounded tips. Radial engine with no spinner. Straight line from blunt nose to cockpit cover set well back. Abnormally tall and narrow fin and rudder. Diamond-shaped tailplane. Undercarriage retracts inwards.
LIGHTNING
Twin-fuselage design with sharply tapering mid-wings and in-line engines. Pilot's cockpit well back in streamlined nacelle from nose of which guns project. Tailplane tips project outside oval rudders.

*Note.*—More than one thousand Tomahawks are now in service with British and Dominion squadrons, mostly in the Middle East, and their pilots speak very highly of them. Equally good reports come from Fleet Air Arm pilots of the Buffalo and Martlet fighters, the only criticism being that the undercarriage of the Martlet has a narrow track.

O.T.U. Mk.1 Blenheims in formation.

# AT A BOMBER O.T.U.

By MAJOR F. A. de V. ROBERTSON, V.D.

THE Operational Training Unit is an institution which has come into being since the outbreak of war, and the man who conceived the idea must be quite a brilliant man. Before the war the Advanced Training Squadrons at the Service Flying Training Schools turned out pilots theoretically ready to take their places in operational squadrons, and, in fact, they were very nearly fit to do so. They still, however, had to learn all the little ways of the particular type of machine with which their squadron was equipped. That did not take long, but in time of war an operational squadron cannot afford any time at all for polishing up the training of new members. Still less can a bomber squadron afford to give time to the combined training of crews—and the team work of air crews is now one of the strong points of R.A.F. efficiency. So the Operational Training Units were started, and as a result a bomber squadron or reconnaissance squadron now gets a complete crew, thoroughly trained to work together as a unit.

A visit to a bomber O.T.U. is therefore an extremely interesting thing, and recently such a visit was paid to one which trains for Blenheims. As most readers of *Flight* know, the crew of a Blenheim bomber consists of three men, pilot, observer (i.e., navigator and bomb-aimer), and wireless operator-air gunner. Each of these has to be brought up to scratch in his own job, each has to become familiar with working in his own special corner inside a Blenheim, and finally all three have to be trained to work together. There is a great deal in this working together. Every man has his own little ways, and his two partners have to get used to those little ways; they must, for example, grow used to the sound of his voice on the intercommunication set and to his pet ways of expressing himself. A man with, say, a broad accent from Glasgow or Toronto might at first be almost unintelligible to men from Yorkshire or Somerset.

### A Post-Graduate Course

The training at an O.T.U. might be described as a post-graduate course, for all the men arrive at the station qualified to wear their appropriate badges, either the pilot's wings, the single wing of the observer, or the badge of the air gunner. Each has proved his ability to do his own job, but each will benefit by a bit of extra polishing; besides, a man must not be allowed to grow rusty after he has been trained, and that is why the long list of waiting men consists of those who have not yet been trained. Hence the impatience so frequently voiced by many who have volunteered and cannot understand why they are left kicking their heels before being called up. After training there must not be, and there will not be, any kicking of heels.

Side by side with all these considerations there is the need to save petrol and to save wear and tear on aircraft. So much of this specialised training has to be done on the ground, and many are the ingenious devices which have been invented to simulate conditions of flight. For pilots there is, of course, the Link trainer, which has been often described and depicted in *Flight*. The gadgets for training the observers and air gunners are perhaps not so well known—in fact, some of them have been invented at this or some other O.T.U. and are gradually being standardised. The pilots may not have flown Blenheims at their S.F.T.S., and they are naturally taught to handle the machine at the O.T.U. This conversion course is a big and important step. The A.M.L. (Air Ministry Laboratory) teacher has also been described. This is for the benefit of the bomb-aimer. He sits beside his pilot in a dummy cockpit in a darkened room, and on the floor a film of a tract of country is projected. Actually it is about eight feet below the cockpit, but it shows the country as it would be seen from a height of 10,000 feet. The observer is told to bomb a certain target on it, and he directs the pilot, who moves the film accordingly until the observer is satisfied and makes the signal which indicates that he has bombed.

### The Spotlight Trainer

An important point on an operational flight is correct reporting by the gunner when he sees enemy aircraft. So each gunner is made to sit in the cockpit of a Blenheim in a darkened hangar while illuminated silhouettes of German aircraft appear suddenly at some spot on the walls. The gunner reports by telephone as he would do to his pilot, but the message comes to the instructor sitting at a table in the hangar. The silhouettes show red for port and green for starboard, and the gunners are taught to call out the colours when reporting. Naturally, individual gunners have their own ways of reporting. One will say in a calm, low voice, "Two Me 110s on our starboard beam"; another will call excitedly, "A dickens of a lot of Jerries on my tail." These idiosyncrasies are discouraged, and a standard form of verbal reporting is being introduced.

There is another practice for air gunners, in actual gunnery, called the Spotlight trainer. If it were not for the expense of the apparatus, it would make a tremendously fascinating game for fairs on Hampstead Heath, and would undoubtedly drive Darts completely out of popularity. But the apparatus consists of a power-operated gun turret mounted in a darkened room with the gun pointing towards a concave apse in the wall, and this would cost a pretty penny. When the gunner presses the trigger a spotlight appears on the wall where his shot would have struck. An instructor stands below with a long torch, over the bulb of which is fitted a silhouette of a Me 109 or other enemy aircraft. He throws this figure on to the wall of the apse and moves it about, while the gunner follows it and shoots at it with his spotlight. The turret is not subject to bumps or evasive action, but none the less one gets a very good idea of the problems of air gunners, and feels greater admiration than ever for the way in which they have so often shot down the Messerschmitts which have attacked our bombers.

Wireless operators spend useful hours (more or less) inside a little box-like compartment known as the Harwell trainer. It is fitted up exactly like the wireless post inside a Blenheim, and the operator gets familiar with all the instruments he has to deal with, talking to the instructor

## AT A BOMBER O.T.U.

outside. Navigators are also isolated, though less stuffily, as they steer an imaginary aircraft on a given course over a map, with an instructor outside in constant communication.

Most impressive of all is the Cubicle Trainer. There are a number of these little boxes, resembling in all essentials the interior of a Blenheim. In each of these a complete crew of three goes for a long imaginary flight, wearing full flying kit and each doing his own job. The flight may last for six hours, though if that time includes the lunch hour the men are allowed out to have their meal. Endurance in the not very spacious quarters of the Blenheim is one of the things which a crew has to learn. Before going in they are briefed, just as they would be before a real flight. There is a window in each cubicle, and on the wall opposite to it films are exposed from time to time. On this occasion the crews were doing a flight over the sea, and they saw a transport ship on the screen at one time and spotted a submarine later on. Sometimes the instructor outside showed them flashes from a lighthouse or beacon, and they had to recognise the flashes. In all respects the instructor acted as ground control and gave them "fixes" when they needed them.

For all there is cockpit drill in such things as raising and lowering the wheels, getting the rubber dinghy ready for use, and dropping dummy bombs on to a mattress below the machine.

Of course, there is plenty of actual flying, too. Navigators and gunners do most of their air work in Ansons, which are roomy and convenient. The whole crew also does sufficient flying together in a Blenheim.

The instructors at an O.T.U. are mainly officers and airmen who have done a period in war flying and have been sent to the unit for a rest. Some of them are very anxious to get back to the real thing, for it is not given to every man to enjoy the work of teaching. It must, however, be very fascinating to see the new air crews taking shape and to feel that the high standard of R.A.F. bombing will be maintained. This visit was a very stimulating and encouraging experience.

**LIGHT AMMUNITION: When the pupil in the power-operated turret presses the trigger, his "hit" is indicated by the appearance of a spot of light on the target which is a silhouette projected under the instructor's control.**

# CANADIAN AIR MINISTER ARRIVES

SAYING that about 80 per cent. of the original Empire Air Training Scheme was now in operation and would be complete by the middle of September—eight months ahead of schedule—Mr. C. G. Power, the Canadian Air Minister, discussed (among other matters) the future of the scheme when he arrived in London last week.

Mr. Power left Montreal on Monday (June 30th), crossed the Atlantic that night in a four-engined Liberator which was being delivered to the R.A.F., and then flew on to London. He is spending a good deal of his fortnight's stay in Britain in visiting Canadian squadrons and Canadian airmen who are serving with the R.A.F.

The Empire Air Training Scheme, he said, had developed more rapidly and to a greater extent than had been expected, with the result that it had been found necessary to increase the number of training establishments beyond the 115 originally decided upon. Already many of the initial training schools had been enlarged to cope with greater numbers of men and additional schools were to be provided. Recruits were coming from all parts of the British Empire and also from the United States. Some 70 aerodromes were now operating at full capacity, there was a steady flow of flying crews to this country and a number of complete R.C.A.F. squadrons were now being formed from graduates of the scheme, which would be extended beyond the expiry date in March, 1943, should the war continue that long.

**Sir Louis Greig, on behalf of the Air Ministry, receiving Mr. C. G. Power on his arrival by plane.**

"The Douglas DB-7 design in its various forms should do much to help us through the prevailing trouble."

# THE HAVOCS ARE COMING

## *Visit to an American Aircraft Reception Station*

MARYLANDS, Mohawks, Chesapeakes, Flying Fortresses and Havocs—some coming out of packing cases, fresh with factory paint, and some carrying the scratches of ice particles from the upper levels over the Atlantic—were seen recently at a Ministry of Aircraft Production station in England devoted to the reception and maintenance of American aircraft. There were also others, among the Marylands and Chesapeakes principally, which showed the marks of having been in action, and repair work was under way on these.

Boeing Flying Fortresses (B-17C) were there in impressive array, for already we have received at least the initial order of 20. Subsequent to this order, the B-17E will be the type received and they will be added to our strength by means of Lease and Lend accountancy. From a seat in the cockpit it was evident that the pilot had "a lot of aeroplane" under his control—the Fortress is about the same size as our own Short Stirling—but he is adequately provided with instruments on a well-laid-out board. To the rear of the cockpit one passes down the centre of the bomb-bay on a very narrow walkway between the spaces which will soon be loaded with the big bombs destined for Germany. Aft of this in the gradually narrowing fuselage are the gun positions in the side and underneath.

All the Marylands at the station had been in use and were back for repair. The Glenn Martin Company has now turned over to the manufacture of a later type, the B-26 Baltimore, colloquially the "flying torpedo." (Incidentally, the B-26 will also be made at the National Steel Car works in Canada, and the initial order is said to be for 200.)

The Chesapeake, which is the Vought-Sikorsky V-156 two-seater dive bomber, is a relic of the French order, but has done good work for us. It is, of course, no longer being received from U.S.A., but numbers of them are still in service. The "high spot" of the visit, however, was to see the latest Havocs and Bostons. These are not yet being flown over but arrive most efficiently packed in very well-designed cases. In fact, the cases are so elaborately made that it almost seems worth while to send them back again for "refilling." But this is not being done, no doubt partly due to the high value of shipping space.

**Fortress, Tomahawk and Boston—they all have their jobs to do, and more and more are arriving to do them. The initial order of 20 Fortresses has been completed, these having been flown over. The Tomahawks and the Bostons still come by sea, but even the Tomahawks may soon be flown via Greenland and Iceland, using auxiliary tanks which will be dropped when empty.**

The much-photographed Boston is familiar to readers, and this version of the Douglas DB-7 is a versatile type which is as much at home on light bombing work as in long-range fighting and ground strafing. In this form it has a crew of three and has four fixed guns in the nose and two free guns in the rear gun position. Its original power was two Pratt and Whitney Twin Wasps of 1,050 h.p., but it is now available with the more powerful Wright

Double-Row Cyclones of 1,600 h.p., having been modified to the two later versions, the DB-7A and the DB-7B.

But the appearance of the Havoc is not familiar as no photographs of this night fighter are permitted. Some of its features can be described, however, without giving the enemy information of value. Soot-black all over, this hawk of the night would certainly appear like an aeroplane of death to the German night bombers—if any of them see it, which they probably do not—before its avenging fire sends them down to destruction or capture. The internal lay-out is different and the nose has not the usual transparent panels, this part of the aeroplane being taken up by the very heavy armament, details of which are secret. There are also other devices which are secret.

The Havoc is a very suitable aircraft for night fighting as it has the speed of a Hurricane coupled with an endurance very much greater, allowing it to stay aloft for long periods for searching out the enemy with the help of radiolocation and perhaps a little moonlight. And its nosewheel undercarriage should make it easier to land at night than the orthodox type. One flew away from the station during the visit, giving an impression of ease and power in the take-off. It was in the charge of an A.T.A. pilot for delivery to a squadron. The Boston and Havoc are placed in the "four plus" class with the Lockheed Hudson for A.T.A. purposes. This means that they are regarded as the most difficult to fly of the twin-engined types, which are all "class four," and only less difficult than the four-engined bombers which make up "class five."

"From a seat in the cockpit it was evident that the pilot had a 'lot of aeroplane' under his control."

It was indeed both inspiring and reassuring to walk through the hangars of the station and see chalked on a fuselage, HAVOC II POLISH, and on another BOSTON III. The Douglas DB-7 design in its various forms, with the British night fighters, should do much to help us through the prevailing trouble.

When American aircraft first started arriving in England, their armament had to be removed and replaced with British. The American machine gun is the Colt of .300 inch calibre, whereas our gun is the Browning .303. Needless to say, the ammunition of one does not fit the other. This situation has been rectified and no waste work is now done as bomb racks to correct British standard dimensions are fitted in U.S.A. and other modifications are installed on this side.

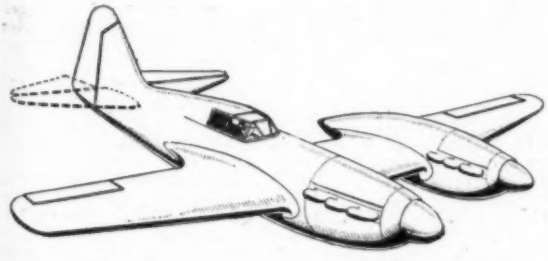
In another of the hangars is the engine shop, and here were seen rows of Allison liquid-cooled V-1710s, newly taken out of their packing cases. Pratt and Whitneys and Wrights, both new and overhauled, were present "in quantity" also.

The station runs instruction classes in maintenance work and crashed engines are sent to it so that instruction engines may be rebuilt out of the unbroken parts. More and more engine test houses were being built outside the main hangars, so that it was evident that the station's present capacity, though considerable, was as nothing to what it will be later.

## Compensation to Clubs

THE General Council of Associated Light Aeroplane Clubs, with headquarters at the Royal Aero Club, 119, Piccadilly, W.1, has now received from the Air Ministry an *ex gratia* payment amounting to £25,000 for distribution amongst those clubs who were unable to meet liabilities incurred in connection with the Civil Air Guard Scheme.

The distribution of this sum is being carried out by a sub-committee of the General Council consisting of Sir W. Lindsay Everard, M.P., Major K. M. Beaumont, and Harold E. Perrin.



"LOPPY": Our correspondent's idea of the unsymmetrical aeroplane referred to last week. We have added the second half of the tailplane in dotted lines.

## Anti-gas Ventilation

MANY air-raid shelters require ventilation by a forced means such as an electrically driven pump. But in a gas attack this system might have to be turned off so that it would not draw gas into the shelter. To guard against this happening, Andamite, Ltd., who are ventilating engineers, have developed an air-purification system which can deal with gas. A centrifugal pump driven by electric motor supplies air to the shelter at a pressure slightly higher than atmospheric, so that a discharge occurs at all openings and leaks. Included in the installation is a filter, containing asbestos merino wool and activated charcoal, which is capable of dealing with the poisonous smokes and gases of war. During a gas attack all air for the shelter is passed through this. The pump can be driven by hand if the electric supply fails. Installations are available in sizes suitable for 25, 50, 100, and 150 people. Particulars of the plant may be obtained from Andamite, Ltd., at 52, Ebury Street, London, S.W.1.

## Tablet to American Pilot

SIR ARCHIBALD SINCLAIR, Secretary for Air, unveiled a tablet to the late P/O. W. L. M. Fiske, R.A.F., the first American-born pilot to give his life for Great Britain in this war, in the crypt of St. Paul's Cathedral on his country's Independence Day, July 4th.

# HERE AND THERE

## New Russian Fighter

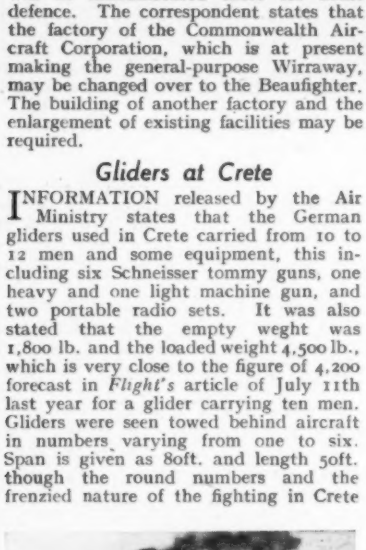
NEWS of the Soviet Air Force is extremely difficult to obtain, but it is known that a new fighter, the I-18, has made its appearance in the war.

## The Australian Beaufighter

A MESSAGE from *The Times* correspondent in Australia indicates the possibility that the Bristol Beaufighter will be manufactured there for home defence. The correspondent states that the factory of the Commonwealth Aircraft Corporation, which is at present making the general-purpose Wirraway, may be changed over to the Beaufighter. The building of another factory and the enlargement of existing facilities may be required.

## Gliders at Crete

INFORMATION released by the Air Ministry states that the German gliders used in Crete carried from 10 to 12 men and some equipment, this including six Schneisser tommy guns, one heavy and one light machine gun, and two portable radio sets. It was also stated that the empty weght was 1,800 lb. and the loaded weight 4,500 lb., which is very close to the figure of 4,200 forecast in *Flight's* article of July 11th last year for a glider carrying ten men. Gliders were seen towed behind aircraft in numbers varying from one to six. Span is given as 80ft. and length 50ft. though the round numbers and the frenzied nature of the fighting in Crete make one a little doubtful as to whether the measurements were taken with a steel tape or by eye while shooting at parachutists. Fuselage construction is steel tubular and the wings are wooden.



**NEW FARNBOROUGH CHIEF : Mr. W. S. Farren has been appointed superintendent of the Royal Aircraft Establishment in succession to Mr. A. H. Hall, who retires. Mr. Farren was Director of Technical Development at M.A.P.**

**UNCONCERNED : Mr. Igor Sikorsky "sat" for an hour and a half and thereby established a new helicopter record, as we pointed out last week. The cine man seems to have lost interest.**

## Vengeance is Ours—Soon

VULTEE AIRCRAFT, INC., of California, confirm that the Vengeance dive bomber on order for the R.A.F. is already in production and that the first few are flying. *Flight* foreshadowed this fact as long ago as May 29th in a special article on dive bombers. At that time the intention was to fit the Vengeance with the Allison liquid-cooled engine. The company now announces that the Wright Cyclone is to be used. No reason is given for the change in plans. The Vengeance is stated to have "the most modern protective devices and armament," and the bombs are carried internally to reduce drag. It is interesting to note that, according to the Vultee announcement, "British requirements for the Vengeance included exceptional range."

## Republic P-47 Thunderbolt

THE Republic XP-47B Thunderbolt, first 2,000 h.p. single-engined fighter to be produced for the United States Army, has been tested by the Materiel Division of the Army Air Corps. The company claims a construction time for the aeroplane which is extremely short; the "go ahead" was signed on September 6th, 1940, and the prototype flew on May 6th of this year, only eight months later. The War Department announces that the Thunderbolt is powered with a 14-cylinder Pratt and Whitney engine driving a four-bladed airscrew. It is of all-metal construction, is comparable in weight with the Lockheed P-38 (which is 13,500 lb.), but slightly smaller in dimensions. The P-38 has a span of 52ft. No information on speed has been released, but such an aeroplane should have a maximum of about 430 m.p.h. The Thunderbolt is stated to be heavily armoured and to have strong fire power from large- and small-calibre guns.

## Latest Messerschmitt 109

THE latest Messerschmitt is the Me 109F2. This is powered with a high-compression DB 601M engine and has a speed equal to that of the latest Spitfire. It is, of course, designed for high-altitude work and has a ceiling over 36,000ft. Landing speed is higher than that of the original Me 109 and range shorter. The blades of the airscrew are shorter, this probably having been done to keep the tip speed below the speed of sound, which decreases with altitude. Armament is two MG 17 machine guns firing through the airscrew disc and one 15 mm. shell gun with a high rate of fire mounted in the hub.

## Instructors' Certificates

FLYING instructors are reminded that the Guild of Air Pilots and Air Navigators of the British Empire is continuing the renewal of certificates current before the outbreak of war.

In order to take advantage of this facility the instructor should send by post to the Guild's temporary address at 309, Crofton Road, Orpington, Kent, on or before the expiry date, his certificate, five shillings renewal fee, a certificate signed by some responsible person to the effect that the applicant has completed 50 hours instructional flying during the last 12 months and a stamped addressed envelope.

It is emphasised that this applies only to renewals of existing certificates and that applications for original certificates cannot at present be entertained. The Guild also points out that, owing to drastic staff reduction, it cannot deal with exceptional cases nor enter into correspondence and that the above conditions must be strictly observed.

# Service Aviation

## Royal Air Force and Fleet Air Arm News and Announcements

### Birthday Honours

**C.B.E.**

Air Chief Marshal Sir F. W. BOWHILL, K.C.B., C.M.G., D.S.O.

**K.C.B.**

Air Marshal W. S. DOUGLAS, C.B., M.C., D.F.C.
Air Marshal W. L. WELSH, C.B., D.S.C., A.F.C.

**K.B.E.**

Air Marshal H. E. WHITTINGHAM, C.B.E., M.B., Ch.B., F.R.C.P., (Lon.), F.R.C.P. (E.), F.R.F.P.S. (G), D.P.H., D.T.M. & H., K.H.P.

**C.B.**

Act. Air Marshal R. M. HILL, M.C., A.F.C.
Air Vice-Marshal D. G. DONALD, D.F.C., A.F.C.
Air Vice-Marshal G. LAING, C.B.E.
Air Vice-Marshal C. W. H PULFORD, O.B.E, A.F.C.

**C.B.E.**

Act. Air Marshal J. S. T. BRADLEY, O.B.E.
Air Vice-Marshal E. W. HAVERS.

**O.B.E.**

Wing Cdr. E. G. NORTHWAY, M.B.E.; Wing Cdr. W. W. DEANE; Wing Cdr. (now act. Grp. Capt.) T. N. MCEVOY; Wing Cdr. P. P. S. RICKARD; Wing Cdr. J. C. STEVENS; Act. Sqn. Ldr. F. P. HEWITT.

**M.B.E.**

Act. Sqn. Ldr. S. A. JORDEN; Act. Sqn. Ldr. A. R. WILLIAMS; Flt. Lt. K. E. PARKES, A.A.F.; Act. Flt. Lt. R. W. ACKERMAN; Act. Flt. Lt. A. D. FORSTER, R.A.F.V.R.; Act. Flt. Lt. F. H. KELLY; Act., Flt. Lt. H. A. POUND, M.C. R.A.F.V.R.; Act. Flt. Lt. W. RUDD; Act. Flt. Lt. G. STEELE; F/O. A. J. HEREFORD; F/O. H. HUDSON; F/O. A. M. FUCKLE, R.A.F.V.R.; F/O. A. W. SLATER, R.A.F.V.R.; W/O. W. BRERETON; W/O. W. L. CUSHING; W/O. J. A. HAGGERTY; W/O. A. J. HARRIS; W/O. L. TAYLOR.

**R.R.C. (1st Cl.)**

Matron, Miss G. E. M. CLUBB, A.A.R.C.

**BAR TO A.F.C.**

Wing Cdr. R. S. BLUCKE, A.F.C.; Sq. Ldr. H. J. WILSON, A.F.C., R.A.F.O.

**A.F.C.**

Wing Cdr H. W. DEAN; Wing Cdr. G. J. L. READ; Wing Cdr. D. J. WAGHORN; Sq. Ldr. A. H. DONALDSON; Sqn. Ldr. H. KERR, R.A.F.O.; Sqn. Ldr. G. H. W. SELBY-LOWNDES, R.A.F.O.; Lt.-Cdr. S. W. D. COLLS, R.N.; Flt. Lt. A. C. BAILEY, R.A.F.O.; Flt. Lt. J. G. BUTT-READ, R.A.F.O., Flt. Lt. W. J. CARR; Flt. Lt. R. E. DRAKE; Flt. Lt. F. U. HOLLINS, R.A.F.O.; Flt. Lt. H. A. HOWES, R.A.F.O.; Flt. Lt., B. E. MOODY, R.A.F.O.; Flt. Lt. D. L. RAYMENT; Flt. Lt. W. K. STEWARD, M.B., Ch.B., B.Sc., R.A.F.V.R.; Flt. Lt. S. WROATH; Flt. Lt. D. O. YOUNG, R.A.F.O.; Act. F/O. P. C. PRICE; P/O. H. F. BISHOP; P/O. R. MIDDLETON; W/O. D. J. PITCHER.

**R.R.C. (2nd Cl.)**

Act. Matron, Miss H. W. CARGILL; Act. Matron, Miss L. H. HARDY; Act. Matron, Miss O. SUDDABY; Act. Matron, Miss C. McL. YOUNGSON.

**A.F.M.**

Sgt. I. D. ROXBURGH, R.A.F.V.R.; Sgt. F. SUMMER.

**B.E.M.**

Flt. Sgt. H. V. GODFREE; Flt. Sgt. A. W. SKINGSLEY; Sgt. P. JOCKEL; Sgt W. THOMAS; Sgt. G. W. E. WALTON; Cpl. W. G. WILL; Cpl. T. R. G. WILLIAMSON, A.A.F.; A/C.1 A. WARDLEY, A.A.F.

### Awards

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations:—

DISTINGUISHED SERVICE ORDER

Act. Group Capt. H. BROADHURST, D.F.C., A.F.C.—This officer has been almost continuously employed on active operations since the war began. He distinguished himself during the intensive air operations over this country in August, 1940, by his determined efforts to intercept and destroy enemy bombers at night. In December, 1940, Group Capt. Broadhurst assumed command of his present unit and throughout has performed outstanding operational work. He has destroyed at least four enemy aircraft, besides damaging several others.

**FORMIDABLE FORMATION: Spitfire Vs in Vic formation above the clouds. The armament of the Spitfire V consists of two 20 mm. shell-guns and four machine guns. Maximum speed is in the neighbourhood of 400 m.p.h.**

One day in June, 1941, he took off alone in an endeavour to locate a pilot whom he believed had been forced down in the sea. In his efforts to direct a rescue boat he flew some eight miles off Cap Gris Nez, but had to return owing to lack of petrol. His ability, keenness and outstanding powers of leadership have been an inspiration to all and have contributed materially to the successes obtained by the squadrons under his command.

BAR TO THE DISTINGUISHED FLYING CROSS.

Act. Sqn. Ldr. P. H. A. SIMMONS, D.F.C., No. 107 Squadron.—In June, 1941, this officer participated in an operational sweep against enemy shipping off the Dutch coast. Undeterred by extremely bad flying conditions, he eventually led his flight in a low-level attack on an enemy convoy. In spite of fierce and accurate anti-aircraft fire, he succeeded in obtaining two direct hits on a vessel of 5,000 tons, while another member of his flight also scored hits on a vessel of similar size. Both ships were destroyed. Earlier in May, Squadron Leader Simmons executed a highly successful operation over Heligoland with magnificent dash. He has at all times shown outstanding leadership and courage.

DISTINGUISHED FLYING CROSS.

Squadron Leader H. M. BIRCH, R.A.A.F., No. 10 Squadron Leader B. G. CORBY, A.A.F., No. 502.
Act. Wing Commander D. R. BIGGS, No. 107
Flight Lieutenant Michael J. B. YOUNG, R.A.F.O.
Lieutenant C. W. B. SMITH, R.N., No. 816, F.A.A.
Act. Flight Lieutenant James W. LOUW, No. 240.
Flying Officer Arthur V. GOWERS, No. 85.
Flying Officer John A. HEMINGWAY, No. 85.
Pilot Officer Henry N. PHILLIPS, No. 269.
Pilot Officer Oliver L. S. PHILPOT, R.A.F.V.R.

Act. Wing Cdr. H. I. EDWARDS, No. 105 Squadron.—In June, 1941, this officer led a formation of aircraft in an operational sweep against enemy shipping off the Dutch coast. A convoy of eight merchant vessels was sighted at anchor about three miles outside the Hague. In the face of intense and accurate pompom and machine-gun fire, the formation attacked from a height of only 50 feet.

Wing. Cdr. Edwards attacked a ship of some 4,000 tons, and, after raking the decks with his forward machine guns, released his bombs from mast high. A considerable explosion followed, debris being thrown in the air, while columns of black smoke were emitted. The vessel was certainly severely damaged, if not sunk. This officer has completed numerous operational missions over enemy and enemy-occupied country and against their shipping, and has at all times displayed great leadership, skill and gallantry.

Act. Sqn. Ldr. D. CLYDE-SMITH, No. 218 Squadron.—One night in June, this officer was the captain of an aircraft which took part in an attack on Hanover. Whilst over Amsterdam, on the return journey, the aircraft was attacked by a Messerschmitt 110. Sqn. Ldr. Clyde-Smith manœuvred his aircraft so skilfully that he enabled both his front and rear gunners to bear on the attacker, and it is believed that the enemy aircraft was seriously damaged, if not destroyed. He then took cloud cover and ultimately flew his aircraft safely back to his base. Since February, 1941, this officer has completed many operational missions, and his leadership and skill have been of great value.

Act. Sqn. Ldr. I. J. SPENCER, No. 110 Squadron.—In June, 1941, this officer led a formation of aircraft which carried out an attack on an enemy merchant ship of about 1,500 tons. In spite of intense anti-aircraft fire from this and other escorting vessels, Sqn. Ldr. Spencer pressed home his attack from a low altitude and the formation succeeded in destroying the merchant vessel. After delivering the attack his aircraft received direct hits, causing damage to the starboard engine and inner port petrol tanks, while Sqn. Ldr. Spencer himself was hit in the left leg, sustaining a fracture in two places, and his observer was wounded in the back.

Despite his injury, Sqn. Ldr. Spencer, with the assistance of his observer, succeeded in flying his aircraft back to this country, although the starboard engine and instrument panel were out of action. On a previous occasion Sqn. Ldr. Spencer successfully bombed an enemy tanker off the Norwegian coast in the face of intense anti-aircraft fire, and although his port engine was disabled, he succeeded in flying his aircraft safely back to this country. He has shown great determination, courage and efficiency.

Act. Sqn. Ldr. J. R. THOMPSON, No. 139 Squadron.—In May, 1941, this officer was the leader of a formation of aircraft which attacked an enemy convoy consisting of seven merchant vessels escorted by seven destroyers and two cruisers. Despite the formidable escort, the attack was made from a low level, and Sqn. Ldr. Thompson himself obtained three direct hits on a 10,000 ton merchant ship which caught fire and became a total loss. In June, 1941, he participated in an attack against a large and strongly escorted enemy convoy to the west of Lampedusa Isle, between Malta and Tunis. The particular section of the convoy attacked consisted of six merchant vessels and six destroyers, and, when the attack was made, the bombs of the leading aircraft struck two of the merchant ships, one of which was an ammunition ship. This blew up with such force that parts of it were hurled 1,000 feet in the air, while a column of smoke rose to about 1,500 feet.

Sqn. Ldr. Thompson's aircraft, which was flying in the rear of the formation, was severely damaged by the blast from the explosion, and his observer temporarily stunned. Despite this, he led the formation back to base without the aid of navigational equipment, which had been blown out of his aircraft when the ammunition vessel blew up. On another occasion in May, 1941, Sqn. Ldr. Thompson obtained two direct hits on an enemy merchant vessel, which, after a subsequent reconnaissance, was found to be drifting after having been abandoned. He has displayed the greatest determination and courage in pressing home his attacks.

Flt. Lt. G. O. BUDD, A.A.F., No. 604 Squadron.—This officer has been continuously engaged on operational flying since September, 1939. He has been a skilful and reliable pilot, whatever the flying conditions. In night combat against the enemy he has destroyed at least three and damaged a further four of their aircraft.

Act. Flt. Lt. S. G. STOCK, No. 7 Squadron.—In June, 1941, this officer was the rear gunner of an

## SERVICE AVIATION

aircraft which took part in an operational sweep of the enemy coast from Flushing to Dunkirk. Following the bombing of some ships near Dunkirk harbour, his aircraft was attacked by three Messerschmitt 109's, but, by brilliant shooting, Flt. Lt. Stock destroyed one and damaged another of the attackers. On a previous occasion he displayed great coolness in the face of considerable odds. Flt. Lt. Stock has always displayed outstanding devotion to duty and keenness in gunnery.

F/O. R. W. Cox, No. 7 Squadron.—In June, 1941, this officer was the captain of an aircraft which participated in an operational sweep of the enemy coastline from Flushing to Dunkirk. Whilst carrying out an attack on some ships near Dunkirk, his aircraft was attacked by two Messerschmitt 109's. During the ensuing battle, F/O. Cox displayed great skill and determination, and, as a result, one of the enemy aircraft was observed to go down into a steep dive with smoke and flames pouring from it.

A few days previously he carried out an operation under extremely unfavourable weather conditions. Despite the fact that shortly after taking off the generator failed and wireless communication with his base became impossible, he continued his mission and successfully bombed his target. He has set an excellent example of courage and devotion to duty.

P/O. J. R. Anderson, R.A.F.V.R., No. 103 Squadron.—One night in June, 1941, this officer was the captain of an aircraft which participated in a low-level attack on dockside buildings at Brest. The target could not at first be identified, and, although fully aware that the area was protected by a balloon barrage, P/O. Anderson remained over the target for 30 minutes until a temporary improvement in visibility afforded the opportunity to attack. Descending from 3,000 feet, his bombs were observed to burst on or near the objective.

Despite intense light anti-aircraft fire, he continued his dive to 900 feet, where he was held in the beams of searchlights, but eight of these were extinguished by his front and rear gunners. P/O. Anderson has completed numerous operational flights, and has always displayed the utmost determination and skill.

P/O. J. W. Sievers, R.A.F.V.R., No. 150 Squadron.—One night in June, 1941, this officer was the captain of an aircraft which took part in an attack on Brest. In spite of intense anti-aircraft fire both from ground defences and ships, P/O. Sievers descended to 4,500 feet and skilfully dropped all his bombs in the target area. On a previous occasion, during an attack on Hamburg, this officer displayed great flying skill which enabled his rear gunner to shoot down a Messerschmitt 110 which attacked his aircraft whilst held in the beams of searchlights. P/O. Sievers has completed many operational missions over enemy and enemy-occupied country, and has shown great skill and coolness throughout.

F/O. K. I. Geddes, R.A.F.V.R., No. 604 Squadron.—This officer has performed excellent work as a fighter pilot and has destroyed at least four enemy aircraft. His skill and thoroughness in preparation for flight have been most marked.

P/O. F. G. H. Chalk, R.A.F.V.R., No. 218 Squadron.—One night in June, 1941, this officer was the rear gunner of an aircraft which took part in an attack on Hanover. On the return journey, whilst over the Amsterdam area, the aircraft was attacked by a Messerschmitt 110 which pressed home two attacks from close range. In the face of accurate cannon and machine gun fire from the enemy, P/O. Chalk fired two steady bursts which were observed to enter the enemy aircraft, causing it to break away with flames coming from the starboard side. By his cool and accurate fire, P/O. Chalk undoubtedly saved his aircraft and probably destroyed the attacker. Since February, 1941, this officer has participated in many operational missions and has shown high courage and devotion to duty throughout.

Act. Flt. Lt. E. Sydney-Smith, R.A.F.V.R., No. 139 Squadron.—In May, 1941, Flt. Lt. Sydney-Smith and Sgt. Shepherd were pilot and observer respectively of an aircraft which attacked an enemy cargo ship, believed to be carrying ammunition, escorted by a destroyer. Two direct hits were obtained on the vessel, which was compelled to seek refuge in Sfax harbour. Four days later they participated in a low level attack against an enemy ammunition ship, lying in Sfax harbour, in the face of intense anti-aircraft fire from destroyers and other ships.

In June, 1941, Flt. Lt. Sydney-Smith and Sgt. Shepherd took part in an attack against a large and heavily escorted enemy convoy. With great skill they obtained direct hits on an 8,000-ton ship carrying ammunition, which blew up with terrific force, hurling parts of the vessel as high as 1,000 ft. Flt. Lt. Sydney-Smith has consistently displayed great courage and determination while Sgt. Shepherd's navigation and bomb aiming have been of a very high standard.

### Distinguished Flying Medal.

Sergeant Hughie Cecil Bailey, No. 233.

Sergeant Derek George Buley, No. 210.

Sergeant William Jackson Coldbeck, No. 206.

Sergeant Peter McDonald Grant, No. 42.

Sergeant Leonard Reginald James, No. 22.

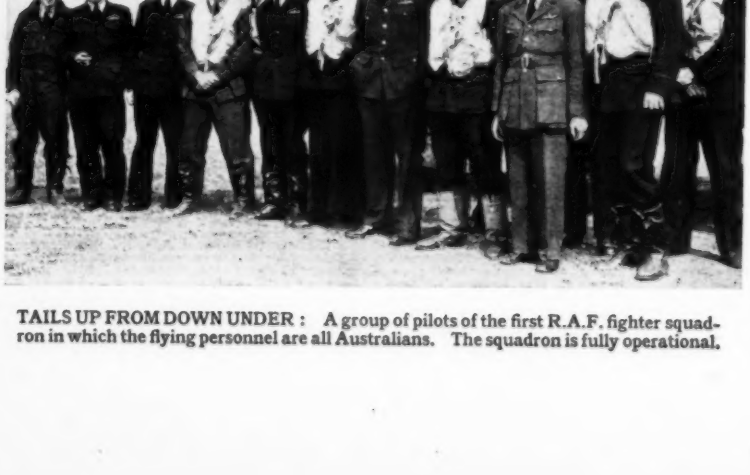
Sergeant James Gardner Simpson West, No. 42.

Sgt. Norman Henry Shepherd, No. 139 Squadron.—For citation see Flt. Lt. Sydney-Smith.

Sgt. G. J. Evans, A.A.F., No. 604 Squadron.—This airman has been continuously employed on operational flying since September, 1939. He has displayed great skill in his duties and has assisted his pilot in the destruction of three enemy aircraft.

Sgt. J. Graham, No. 7 Squadron.—In June, 1941, this airman was the rear gunner of an aircraft which was attacked by two enemy fighters about 20 miles west of Texel, in Holland. His aircraft was attacked simultaneously from the port and starboard quarters. During the combat, Sgt. Graham's reflector sight became unserviceable and two of his guns jammed. Despite continuous attacks, Sgt. Graham coolly repaired the damage to his reflector sight and cleared the gun stoppages, after which he withheld his fire until one of the attacking aircraft was in close range. He then fired a long burst which caused it to break away and subsequently dive straight into the sea.

Sgt. J. D. V. S. Stephens, R.A.F.V.R., No. 83 Squadron.—One night in June, 1941, this airman was the pilot of an aircraft which carried out a successful attack on the goods yard at Soest. The vicinity of the target area was obscured by low cloud and visibility was poor, but Sgt. Stephens descended to 1,000 ft. and made a careful reconnaissance by the light of flares dropped from other aircraft. Finally locating his objective he released his bombs which were seen to burst on the permanent way. He then descended to 800 ft. and machine gunned a train standing in the goods yard. Sgt. Stephens has at all times shown great keenness, initiative and courage.



**TAILS UP FROM DOWN UNDER : A group of pilots of the first R.A.F. fighter squadron in which the flying personnel are all Australians. The squadron is fully operational.**

# London Gazette

## Royal Air Force

*Air Ministry,*
*July 1, 1941.*

*General Duties Branch.*

Air Marshal Sir P. B. Joubert de la Ferté, K.C.B., C.M.G., D.S.O., is promoted to rank of Air Chief Marshal (temp.) (July 1).

Air Vice-Marshal (Act. Air Marshal) W. L. Welsh, C.B., D.S.C., A.F.C., is promoted to rank of Air Marshal (temp.) (July 1).

## Royal Air Force Reserve

Reserve of Air Force Officers.

*General Duties Branch.*

Sqn. Ldr. B. E. Harrison is granted rank of Wing Cdr. (June 2).

## Royal Air Force Volunteer Reserve

*Administrative and Special Duties Branch.*

Hon. F/O. J. W. Buck is granted hon. rank of Flt. Lt. (June 17).

F/O. L. C. Saxby relinquishes, at own request, rank of F/O., and is transfd. to General Duties Branch in rank of P/O. (June 11).

*Air Ministry,*
*June 27, 1941.*

*General Duties Branch.*

Flt. Lt. (temp. Sqn. Ldr.) R. C. Love is granted a permt. commn. in substve. rank of Flt. Lt. (Apr. 16).

F/O. T. E. J. Fitton (since promoted to Flt. Lt., and transfd. to Technical Branch), is granted a permt. commn. (Oct. 21, 1939).

The folg. are granted commns. for drn. as F/O. on probn.:—W/O.: (June 5) R. W. Knights. As P/Os. on probn.:—Sgts.: (Aug. 30, 1940) S. J. B. Snowden, D.F.M.; (May 11) P. G. J. Cranley; (May 14) S. Sumner; (May 22) G. F. Hodder, J. Gilmour; (May 27) J. Craig; (May 29) N. H. Josling. Temp. Sgt.: (May 16) J. H. Moutray, D.F.M. Cpl.: (May 9) S. Park.

The folg. P/Os. on probn. are confmd. in their appts. and promoted to war substve. rank of F/O.:—(Apr. 1) W. R. Acott, F. A. B. Tams; (Apr. 7) G. Robinson; (June 15) J. W. White; (June 12) W. Fletcher, D.F.M.; (June 18) R. L. L. McCullough; (June 20) C. McK. Dunniciffe, F. B. Everest, E. P. M. Fernbank, J. L. Fletcher, D.F.M., G. Ryder, G.M.; (June 21) G. A. C. Potts, D.F.C., J. A. Sims, R. F. Jones, T. W. Newbould; (June 22) N. Butler, K. H. W. Dodkin, A. T. Maudsley, D.F.C., D.F.M., C. J. Batho, A. W. Belbin, A. G. Blagden, N. E. Hore; (June 25) K. J. Plested, D. B. Clifford; (June 26) W. M. Collins; (June 29) A. Reece.

Act. P/O. on probn. P. G. Polsue is graded as P/O. on probn. Apr. 7, 1940, and confmd. in his appt. (July 10, 1940).

The folg. F/Os. are promoted to war substve. rank of Flt. Lt.:—(Sept. 3, 1940) A. D. Panton, D.F.C.; (May 24) C. Marshall; (May 25) K. G. Davis, D. T. Macpherson; (May 27) F. J. Knight; (May 28) J. J. McKay, D.F.C.; (June 17) H. D. Clark, T. C. Murray, D.F.C., H. Parkinson, W. D. B. Ruth, D.F.C., D. Salwey.

F/O. R. J. Wells, D.F.C., is granted war substve. rank of Flt. Lt. (Mar. 4).

The folg. P/Os. are promoted to war substve. rank of F/O.:—(Jan. 23) T. K. H. Stoney; (Apr. 7) C. W. H. Thomson, P. G. Polsue; (Apr. 9) J. B. Paterson; (Apr. 29) H. T. Gilbert, D.F.C.; (May 4) P. J. E. Ritchie, D. A. Thomas; (May 13) D. W. Barlow (Capt., R.T.R.), A. P. Q. Bluett (2nd Lt., R.T.R.), E. Chegwin (Lt., D.C.L.I.), B. P. W. Clapin (2nd Lt., R.E.), A. N. Davis (2nd Lt., R.E.), J. B. A. Fleming (2nd Lt., R.A.), F. L. Gates (Lt., R.T.R.), D. G. Harley (2nd Lt., A. and S.H.), H. G. Munro (2nd Lt., R. Scots) R. T. H. Pughe (2nd Lt., K.O.R.R.), J. M. H. Sargent (2nd Lt., R.T.R.), A. P. W. Strachan (2nd Lt., Hampshire R.); (May 18) R. W. Atkinson (2nd Lt., Middx. R.), J. J. P. Kenny; (May 25) R. E. Troward; (June 1) W. C. Wigmore; (June 7) L. D. Emblem (2nd Lt., R.T.R.).

P/O. L. L. K. Wilcox is granted war substve. rank of F/O. (Feb. 28).

P/O. on probn. J. Watson is promoted to war substve. rank of F/O. on probn. (May 15).

Air Comdre. (act. Air Vice-Marshal) H. G. Smart, O.B.E., D.F.C., A.F.C., relinquishes act. rank of Air Vice-Marshal (May 17).

Wing Cdr. J. D'A. Keary is seconded for special duty (May 21).

The folg. are transfd. to Technical Branch:—Wing Cdrs.: (Apr. 24, 1940) H. St. G. Burke, P. Bathurst. Sqn. Ldr.: H. B. Wrigley. P/O. on probn.; (May 19) G. Ryder.

The folg. Act P/Os. on probn. relinquish their short service commns. on appt. to commns. in the R.A.F.V.R.:—(July 6, 1940) R. J. Jennings; (Jan. 14) F. R. Godsmark.

P/O. W. S. Stearns resigns his short service commn. (June 10).

*Technical Branch.*

The folg. are granted commns. for durn. as F/Os. on probn.:—W/Os.: (Apr. 18) V. M. Montanini; (May 28) A. Rowbotham; (June 1, Sen. Nov. 20, 1940) H. G. Aylen; (June 10) W. F. Nash. As P/Os. on probn.:—W/O.: (May 8) S. W. Searle. Flt. Sgts.: (Apr. 21) F. G. Hoad; (May 6) S. C. Marven. As Act. P/Os. on probn.:—Flt. Sgts.: (May 17) C. G. Euston, D. J. Ellery, E. B. Loftus, H. B. Salter, A. W. Skingsley, D. J. C. Frost, H. J. R. Hallstone, C. W. Sheppard, A. M. Coole, L. W. N. Walker, L. H. Mar-

**DIFFERENT FROM A MAURICE FARMAN: Air Chief Marshal Sir Charles Portal in the cockpit of a Curtiss Tomahawk. When Sir Charles learnt to fly in 1915 Maurice Farmans with 70 h.p. engines were the vogue.**

tin; (May 30) E. H. Maule. Sgts.: (May 14) F. H. Dimmer; (May 30) A. G. Waterhouse, R. N. Wells, P. J. Preston, A. McArthy, J. L. Lendrem, S. Williams; (June 1) J. W. McKelvey.

P/O. on probn. L. G. Leech is confmd. in his appt. and promoted to war substve. rank of F/O. (June 25).

Flt. Lt. G. H. Harrison is promoted to rank of Sqn. Ldr. (temp.) (June 1).

The folg. P/Os on probn. are promoted to war substve. rank of F/O. on probn. (May 15):—W. L. Weager, C. V. Ocarroll.

*Administrative and Special Duties Branch.*

The folg. are granted commns. for drn. as F/Os. on probn.:—W/Os.: (May 23) G. H. Prout; (June 2) A. S. Hamlett. As P/Os. on probn.:—W/Os.: (Mar. 14) R. How; (May 30) R. McF. Ferguson. Flt. Sgt.: (June 7) H. E. Dunn. Sgt.: (May 23) S. W. Timmis.

Act. P/O. on probn. J. Billington is graded as P/O. on probn. (Apr. 25).

The folg. P/Os. on probn. are promoted to war substve. rank of F/O. on probn.:—(May 1) T. H. Elliott, H. Franklin: (May 15) S. J. Eales, M.B.E.; (June 1) G. W. Brisbane.

The folg. are transfd. to Technical Branch:—P/O.: (Sept. 9, 1940) W. A. Thorpe. P/Os. on probn.: (Feb. 3) W. R. Scrivener; (Mar. 28) A. F. Harris.

F/O. D. F. Brooks relinquishes rank of F/O. at own request, and is transfd. to General Duties branch in rank of P/O. (Mar. 9).

*Equipment Branch.*

W/O. F. G. Smith, M.M., is granted a commn. for durn. as F/O. on probn. (Apr. 8).

The folg. F/Os. are promoted to rank of Flt. Lt. (temp.) (June 1):—E. D. Hills, M.B.E., D. MacD. Jannaway.

The folg. P/Os. on probn. are promoted to war substve. rank of F/O. on probn.:—(Mar. 1) A. R. G. Wolff; (May 15) J. V. Evans, C. J. Micheile; (June 1) E. V. Blazey.

*Accountant Branch.*

The folg. are granted commns. for durn. (May 30) as P/O. on probn.:—W/O.: A. C. Holmes. As Act. P/O. on probn.:—Sgt.: M. Hemingway.

F/O. J. E. S. Salter is promoted to rank of Flt. Lt. (temp.) (Dec. 1, 1940).

P/O. J. T. Marshall is granted war substve. rank of F/O. (Mar. 11).

*Medical Branch.*

Flt. Lt. W. P. Stamm, M.B., B.S., M.R.C.S., L.R.C.P., is promoted to rank of Sqn. Ldr. (temp.) (June 1).

F/O. E. H. Lamb, M.B., Ch.B., is promoted to war substve. rank of Flt. Lt. (Mar. 1. Sen. Mar. 6, 1940).

## Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS.

*General Duties Branch.*

F/O. G. K. Lawrence is promoted to war substve. rank of Flt. Lt. (June 2).

Flt. Lt. L. E. Falla relinquishes his commn. on acount of ill-health (June 23).

*Administrative and Special Duties Branch.*

Flt. Lt. R. H. Stocken is transfd. to Technical Branch (May 21).

## Royal Air Force Volunteer Reserve

*General Duties Branch.*

The folg are granted commns. for durn as P/Os. on probn.:—(Sept. 30, 1940) S. S. Hordern. Sgts.: (Feb. 28, Sen. Oct. 28, 1940) D. G. Hornsey; (Mar. 16) H. R. Bentley, R. O. Boon, R. T. Franklin, J. Hartley Rodgers, F. J. Trevers; (Apr. 2) D. G. L. Buckley, M. W. Major, C. D. Mayger; (Apr. 23) J. E. Simmonds; (May 8) A. O. Johnson; (May 15) J. A. Bright; (May 17) G. S. Bowers; (May 22) E. A. Mould, E. A. Masters; (May 27) J. H. B. Burgess, A. W. Woolley, D. J. Chipping; (May 29) N. J. Bennett, L. A. Parr; (June 1) D. I. Evans; (June 5) W. R. Evans; Temp. Sgt.: (May 1) J. R. Bushell. L.A/C.: (Mar. 12) J. MacGillivray; (Apr. 6) C. C. Lockyer; (Apr. 20) P. C. Chappell, E. N. Green; (May 9) R. G. Alfrey, A. S. Cussens, J. R. Parsons; (May 11) R. Jones, R. Langley, J. W. D. MacCormac, E. P. W. Marriott, J. A. Mather, A. H. Metcalfe, R. E. Pratt, J. L. Ramson, A. W. Raw, O. W. Russ, A. L. Searby, G. F. Stent, H. E. H. Gillett, D. K. McCuaig, J. O. Mathews, J. D. Bolton, D. P. Boulnois, K. C. Deadman, R. N. R. Getteman, B. H. D. Foster, G. I. Howell, D. S. Jackson, T. F. Jacobs, G. M. Stooke, J. P. Tolson, H. A. Turner, T. R. R. Wood D. A. Woolfe, B. H. Werts, J. Young; (May 15) G. N. Halliday, P. J. Kelley; (May 18) R. E. Davies; (May 25) F. C. Ashley, H. J. Bullock, C. Dent, J. G. Eldridge, J. B. King, A. Kinniburgh, M. W. Schofield, R. W. Bartlett, W. Dunnett, P. H. Edmonds, C. G. Ford, M. Graham, A. F. McManemy, W. B. Orr, W. G. C. Beatson, J. L. Bromiley, J. N. Chance, E. Fox, H. G. Goldie, H. Grant, K. Greenwood, G. H. Hill, S. McAllister, D. McHarrie, W. S. Robinson, G. C. Rolland, R. A. V. Salmon, S. P. Edgehill; (May 29) S. W. Benton, J. F. Brookes, V. J. Clarkson, D. N. Cochrane, D. E. Cooper, S. J. Houlden, W. McTurk, M. L. Pearson, K. T. Reeves, H. J. Sanderson, E. D. Smith, G. F. J. Waite, T. L. Weller, A. L. Williams, L. C. R. Wilson, F. C. Young; (June 1) W. G. Barnes, C. D. A. Browne, J. M. E. Daniels, A. J. Downing, W. G. Foxall, H. W. Griffin, P. B. de Normanville, J. H. Kenny, C. E. Sluggett, W. P. Tudor, S. Widdup, W. J. Smith, C. H. Brown, R. J. Cave, S. L. Cockbain, R. Goodfellow, J. C. Howell, L. W. Richards, P. J. Wheeler, W. H. Coke-Kerr, G. D. Bates, C. B. Archer, G. J. Sneezum, E. H. C. Theobald, C. L. Pilkington, R. M. Thomas, G. A. O'Brien. As Act. P/O. on probn.:—R. J. Jennings.

The folg. P/Os on probn. are confmd. in their appts. and promoted to war substve. rank of F/O.:—(Apr. 1) R. Eyton-Williams; (Apr. 30) W. D. Williams, D.F.C.; (May 5) W. G. W. Wilkes; (May 12) R. W. F. Wightman; (May 19) R. I. Chaffe, V. S. H. Duclos, F. T. Flower, E. G. Franklin, E. D. Levien, W. T. A. Womack; (June 22) C. C. H. Davis; (June 27) R. J. Hiller; (June 29) A. G. Macleod, J. McC. Paxton.

P/O. on probn. A. Lammer is confmd. in his appt. (Mar. 15) and promoted to war substve. rank of F/O. (May 4).

P/O. on probn. E. A. Morrison is confmd. in his appt. (Mar. 16) and promoted to war substve. rank of F/O. (May 4).

P/O. on probn. A. J. Smitz is confmd. in his appt. (Mar. 26) and promoted to war substve. rank of F/O. (May 4).

P/O. on probn. R. W. Hurnall is confmd. in his appt. (Apr. 6) and promoted to war substve. rank of F/O (May 15).

P/O. on probn. L. H. Kay is confmd. in his appt. (Apr. 6) and promoted to war substve. rank of F/O. (May 15).

The folg. P/Os. on probn. are confmd. in their appts. (Apr. 20) and promoted to war substve. rank of F/O. (May 13):—J. M. Jones, G. C. Loach, J. A. G. Skinner, J. G. Warry.

The folg. P/Os. on probn. are confmd. in their appts. (Apr. 6) and promoted to war substve. rank of F/O. (May 14):—H. M. Falconer, R. S. Geach.

P/O. on probn. G. R. Watson is confmd. in his appt. (Mar. 26) and promoted to war substve. rank of F/O. (May 15).

The folg. P/Os. on probn. are confmd. in their appts. (Apr. 20) and promoted to war substve. rank of F/O. (May 15):—N. M. Gerrard, L. A. J. Mills, C. E. N. O'Rourke, S. J. Pearmain, E. C. Whitehead.

## SERVICE AVIATION

The folg. P/Os. on probn. are confmd. in their appts. (Mar. 29) and promoted to war substve. rank of F/O. (May 16):—J. A. Pulton, A. G. A. Rabnitt.

P/O. on probn. L. T. Marks is confmd. in his appt. (May 18) and promoted to war substve. rank of F/O. (June 15).

The folg. Act. P/Os. on probn. are graded as P/Os. on probn.:—(July 27, 1940) R. J. Jennings; (July 28, 1940) G. E. Davies, M. C. B. de Sarigny; (Aug. 26, 1940) W. H. Corbett, C. Ll. Evans, M. I. A. Mendoza, F. A. Montford, F. E. Pratt, N. Ruck, A. Sharples, N. R. Shuttleworth, E. H. Tomlinson, A. E. Mills; (Oct. 23, 1940) S. W. Lambourne; (Nov. 29, 1940) R. Rawlins, P. Lane; (Feb. 17, 1940) F. W. Bailey; (May 6) E. D. A. Shepherd.

F/O. J. G. Giddins is promoted to war substve. rank of Flt. Lt. (May 11).

The folg. P/Os. are promoted to war substve. rank of F/O. (May 9):—N. J. Edwards, H. A. Stratton.

The folg. P/Os. are granted war substve. rank of F/O.:—(Feb. 1) A. Watts-Williams, D.F.C.; (Feb. 21) R. S. Cooper; (Apr. 21) G. P. Hall.

The folg. are transfd. to Administrative and Special Duties Branch:—F/O: (June 13) C. T. Martin. P/O. on probn.: (June 15) P. L. Gauntlett.

P/O. on probn. R. Westenra relinquishes his commn. on account of ill-health (June 14).

*Technical Branch.*

The folg. are granted commns. for durn. as Act. P/O. on probn.:—(May 16) C. C. Ricketts; (May 17) E. Eastwood; (May 23) E. C. Bussell; (May 30) J. M. Davidson, G. R. Gibbs, H. F. N. Jones, J. Needs-Howe, R. A. Reilly, S. B. Rochester. Flt. Sgt.: (May 30) C. T. Dermott. Sgt.: A. E. Mantell.

The folg. P/Os. on probn. are confmd. in their appts. and promoted to war substve. rank of F/O.:—(Jan. 8) E. G. Fischelles; (Apr. 15) J. C. Garland; (Apr. 19) R. W. Sawyer; (May 1) J. A. Nottage; (May 3) A. W. Dale, I. S. Davies, C. J. Williams; (May 4) W. J. C. Nott, K. A. Rowland; (May 11) S. Fletcher, P. G. Randell; (May 18) F. W. Hayter, T. W. J. Temple, H. B. E. Waters; (May 25) J. Archibald, R. L. Brooks, T. I. Cameron, J. K. Hyde, J. M. Rattray; (May 31) P. N. H. Gush, W. A. Webb; (June 7) W. A. Radley.

The folg. P/Os. are granted war substve. rank of F/O.:—(Feb. 14) R. H. Payne, B. Samways; (Apr. 22) A. C. Gray.

F/O. A. H. E. Rogers relinquishes his commn. on appt. to a commn. in the Army (May 1).

*Balloon Branch.*

The folg. are granted commns. for durn. as P/Os. on probn.:—Sgts.: (May 28) M. E. Bartlett, H. T. William.: (June 3) J. N. Debbin. Cpls.: (May 28) C. L. Peacher; (May 29) M. H. Carter, E. Heron; (May 30) C. M. L. Grundy, T. W. Heath. L.A/C.: H. G. Pratt.

The folg. P/Os. on probn. are confmd. in their appts. and promoted to war substve. rank of F/O.:—(Apr. 22) I. W. Killeen; (June 18) W. T. Forde; (June 21) D. L. David.

The folg. are transfd. to Administrative and Special Duties Branch:—Flt. Lt.: (June 15) J. N. Mearns. P/O. on probn.: (June 5) W. F. A. Snell.

*Administrative and Special Duties Branch.*

The folg. are granted commns. for durn. as Flt. Lt.:—(June 13) Lieut.-Col. L. A. Eddis, R.A. (Ret.). As P/Os. on probn.:—(Mar. 29) C. H. Pigg, M.C.; (Apr. 5) L. O. Lawrence; (May 3) R. F. Dickinson; (May 15) J. Hurst, J. Walker. N. W. Weblin; (May 16) J. Beanmont, W. F. Hayman; (May 23) W. G. Campbell, G. E. Stamper; (May 27) W. H. Campe; (May 30) F. D. Andrews, B. C. B. Earl Annesley, L. H. Ashley, H. J. Beausire, C. F. Birch, K. S. Bradshaw, H. E. Castell, C. E. Davies, W. H. Dotesio, T. Duckett, E. Evans, S. S. Evans, C. R. Field, A. G. A. Harmsworth, G. W. Hibbert, P. A. Howden, A. C. Howell, D. M. John, G. E. Johnson, F. Jones, A. Macleod, F. S. W. Medwin, E. J. Mordaunt, J. H. Page, W. P. Priest, R. N. Reid, T. B. Simm, R. G. Stamp, G. T. Suttle; (May 31) C. N. Bond, J. Duffy, H. O. Faircloth, S. R. Gillespie, W. B. Munro, E. Roberts, G. R. Winter, S. W. Woolfenden, J. F. Willatt; (June 9) R. Aird, H. P. Beauchamp, A. L. Chisholm, D. Macalister, F. A. Parkin, W. A. Scanes, E. R. Wood. L.A/C.: (June 5) J. H. Murray Smith. A/C.2: (May 8) M. Boddey. As Act. P/O. on probn.—Cpl.: (May 16) G. F. Miller. A/C.1: F. G. Hallett; (May 31) W. H. Powell. A/C.2: (May 18) S. H. O'Mara.

The folg. P/Os. on probn. are confmd. in their appts. and promoted to war substve. rank of F/O.:—(Apr. 1) J. Thompson; (Apr. 19) R. F. Bland, D. Meinertzhagen, G. T. Townsend, R. F. M. Wilkinson; (Apr. 24) F. G. Whitaker; (Apr. 25) R. A. Birch, H. O'D. Morrison; (Apr. 26) G. H. Simms; (Apr. 28) L. J. Cooke; (May 1) A. N. Banks, F. L. Rees; (May 2) D. F. Whitehead; (May 4) G. G. Andrewartha, J. D. Esbelby, R. E. Lewin; (May 7) L. F. H. Bird; (May 8) M. W. Claye; (May 14) S. D. Merrick; (May 16) G. G. Cooper, P. Moriarty; (May 17) D. M. West; (May 20) A. G. Morkill; (May 22) E. Dancy; (May 23) C. C. Hoey; (May 27) G. T. S. Shapley, E. P. Clennell; (May 31) S. E. P. Atherley; (June 1) J. C. S. Butement, R. V. S. D'Arcy Hildyard, C. S. Twist; (June 2) W. Mailer; (June 3) L. N. Robertson; (June 27) W. Moore.

P/O. on probn. D. F. Brooks is confmd. in his

# SERVICE AVIATION

appt. (Jan. 2) and promoted to war substve. rank of F/O. (Feb. 3).

P/O. on probn. L. E. Archer is confmd. in his appt. (Mar. 15) and promoted to war substve. rank of F/O. (May 13).

The folg. Act. P/Os. on probn. are graded as P/Os. on probn.:—(Feb. 9) J. R. Linklater, W. B. Webster; (Mar. 6) G. C. A. Holt; (Mar. 7) K. D. Acton; (Mar. 10) A. S. Owers; (Mar. 17) J. A. H. Smith, F. C. D. Parkinson; (Mar. 21) J. B. Aitken; (Mar. 28) M. J. Griffiths; (Apr. 4) I. D. Keith; (Apr. 11) T. G. Forster, W. E. Jones, B. H. Cudmore; (Apr. 12) C. R. S. Beale; (Apr. 18) H. E. Collingwood, F. K. Smith, W. C. Pollard; (Apr. 24) W. G. Carter; (Apr. 25) S. T. Wibrew. A. G. W. Loader, A. E. Mansell, A. J. Glayshev, M.M., H. H. Levy, W. Richardson, C. E. Robotham, J. Kendrick, W. B. Soames, C. E. R. Sanderson, C. R. Cuthbert, H. C. Burland; (Apr. 28) G. T. Day; (May 2) A. A. N. Berveridge; (May 5) R. S. Bussey; (May 9) H. E. M. Kingdon, A. L. Kerridge; (May 12) C. W. Parkins; (May 16) C. G. de T. Heelis, T. F. Ryalls, W. R. Wooldridge, E. Skelton, R. D. R. Probert; (May 17) E. Lloyd-Jones; (May 23) W. A. A. Kinge, J. D. Warren, R. H. Jubb, F. H. Tofts, D. F. G. Hastings, J. W. Flann, G. E. W. Priest, A. G. Stirk, H. S. Fowler, F. R. Warren, H. P. Coates, D. M. R. Stewart, J. E. Francis, T. B. Leventhorpe, R. Thompson-Hill, W. Heath.

The folg. P/Os. are granted war substve. rank of F/O.:—(Aug. 9, 1940) H. B. Watson; (Oct. 6, 1940) V. Beadon, M.C.; (Oct. 8, 1940) A. W. Ryan, D.S.O.; (Nov. 15, 1940) F. S. Goss; (Nov. 22, 1940) F. P. Duck, D.S.O.; (Nov. 29, 1940) E. D. King; (Dec. 9, 1940) J. E. Horwell; (Jan. 11) C. T. Theobald; (Jan. 14) F. C. A. Thorpe; (Jan. 15) C. F. Hall, F. S. Sheridan, T. F. D. Rose; (Jan. 16) M. S. McCorquodale, M.P.; (Jan. 17) K. Broadley; (Jan. 20) R. Gillmore; (Jan. 24) J. C. P. M. Davis; (Jan. 26) W. V. Brooks, M.C., N. W. B. B. Thoms, C.B.E., D.S.O., M.C.; (Feb. 1) Sir W. L. Stampe, E. M. Neame, A. B. W. Thomas; (Feb. 5) T. F. Raine; (Feb. 7) H. M. Allen; (Feb. 8) A. S. Clayton; (Feb. 11) G. G. Gilbert-Green, M.B.E.; (Feb. 18) L. B. Earp; (Feb. 20) G. P. Daniels; (Feb. 26) G. Edward-Collins, C.I.E., M.C.; (Feb. 27) F. G. Hayward, D.F.M., A.F.M.; (Feb. 28) L. I. Stranger-Jones; (Mar. 12) S. B. Johnson; (Mar. 15) M. R. Haseler; (Apr. 1) E. T. Elliott; (Apr. 18) W. H. Bragg; (Apr. 22) W. F. Timms.

The folg. P/Os. on probn. are transfd. to General Duties Branch:—(Mar. 9) G. R. L. Gaunt; (Mar. 29) D. A. L. Campbell.

The folg. are transfd. to Technical Branch:—Flt. Lts.: (April 24, 1940) W. E. Crook, J. V. Edwards; (May 1) H. J. Padfield. F/Os.: (June 17, 1940) J. M. Welshman; (Dec. 16, 1940) R. E. Young, G. W. H. Larkby; (Mar. 23) G. L. Danielson, G. Doyle, G. R. Sharp, W. Thomson, C. W. Thompson. F/O. on probn.: (Jan. 25) T. H. Bridgewater. P/O.: (Oct. 3, 1940) D. P. Taylor. P/O. on probn.: (Apr. 24, 1940) P. W. Ford; (Aug. 14, 1940) J. C. Garland; (Sept. 17, 1940) R. H. Davies; (Oct. 28, 1940) P. N. Jarboe; (Nov. 11, 1940) D. W. Densham, D. M. J. Tyre; (Jan. 31) M. T. Thein; (Feb. 10) E. J. C. Hatchard; (Apr. 23) S. F. Pearson; (May 7) J. A. Cracknell, J. L. T. Evans, D. Guha, J. Rawes.

P/O. on probn. C. T. T. R. Bouchet is transfd. to Legal branch, on probn., and granted rank of Flt. Lt. (May 13).

P/O. R. W. Fowler relinquishes his commn. on appt. to Indian Army (Apr. 17).

P/O. on probn. E. H. Smouha relinquishes his commn. on account of ill-health (June 17).

The folg. resign their commns.:—(May 26) P/O. J. P. Winckworth; (June 12) P/O. on probn. L. Parsons.

The folg. P/Os. on probn. relinquish their commns on account of ill-health:—(Apr. 30) J. R. Hardwick; (May 1) J. L. Carr; (May 2) C. E. Pring; (May 3) W. P. Gill (substd. for notifn. of May 9).

The commns. of the folg. P/Os. on probn. are terminated on cessation of duty:—(Sept. 10, 1940) G. H. B. Dent; (May 9) A. G. L. Miller; (June 4) J. L. Lynn; (June 13) J. N. McHale, H. L. Reed, E. H. Sadler; (June 14) G. H. Woodhouse.

Flt. Lt. E. Travers Smith is dismissed the service by sentence of G.C.M. (June 6).

*Training Branch.*

The folg. are granted commns. for durn. as Act. P/Os. on probn.:—(Feb. 1) J. A. Baxter, H. Brooks, A. Chapman, A. H. Chapman, C. Chesterfield, S. V. Christopher, D. F. Cock, L. H. B. Collins, W. Dean, T. G. Duthie, W. Eatock, P. T. Finlay, M.M., C. A. Firmin, M.B.E., F. Fisher, A. K. Fitton, J. H. Franklin, C. R. Gooding, S. Hayter, W. H. Hook, J. G. Mason, A. J. Metcalfe, G. Munro, W. E. Neville, R. Phillips, T. W. Pilkington; (Feb. 11) W. Roberts; (Feb. 18) W. H. Dallow; (Feb. 20) G. R. I. Paterson; (Feb. 22) T. T. Williams; (Feb. 24) J. C. Clancey, O. E. Randle, W. H. Semper, F. Stansfield; (Feb. 27) W. Allan, T. H. Burns; (Feb. 28) J. W. Gravely; (Mar. 1) J. D. Abey, W. Adamson, G. B. Burr, D. D. Richardson, J. R. Riddell; (Mar. 3) J. P. Cox; (Mar. 4) C. R. Gooding, T. Sanderson; (Mar. 5) C. Lamb, W. O. Macdonald; (Mar. 6) G. S. Myles; (Mar. 7) F. Barker, C. H. Moore, H. S. Rees; (Mar. 8) A. H. Fry, C. E. W. Thresher; (Mar. 10) G. Gleave, E. F. Macnamara; (Mar. 11) J. G. T. Castle, L. Jones, J. Lord; (Mar. 12) P. J. Leahy, C. T. Mace; (Mar. 13) H. H. W. Brice; (Mar. 14) A. E. Dingle, W. F. Herbert, O. E. Miller, J. O. Moss, H. Pughe-Evans; (Mar. 17) S. A. Brabner, D.F.C., H. L. Christie, J. K. Dale, N. L. Walker; (Mar. 18) E. C. Chisman, J. T. Moore; (Mar. 19) E. Dale, H. S. Stidolph; (Mar. 20) A. G. Mason, W. B. Sydenham; (Mar. 21) C. A. B. Borrett, W. E. de B. Diamond, C. H. Enders, S. Leaker, J. V. E. Rundle, J. C. Vickery; (Mar. 22) F. H. Hosier; (Mar. 24) H. Bailey, F. Bamford, P. N. Clough, F. S. B. Cone, H. W. Davies, W. D. Davis, R. H. Dennett, T. A. Glassey, H. C. Griffiths, S. Hass, A. Holt, K. T. Irwin, H. Jones, R. M. Lee, C. C. Miller, F. G. Morris, F. D. Potter, J. A. Reilly, J. Ruddy, W. S. Walker, E. E. Wild, A. S. Wright; (Mar. 25) H. E. Appleyard, F. C. Aulagnier, C. Ball, L. A. G. Carr, W. Gott, F. Lacy, F. G. Wood; (Mar. 26) B. S. Allen, R. T. O. Drummond, D. W. Lyall, G. W. Marwood, A. B. Stevenson; (Mar. 27) A. E. Postgate; (Mar. 28) S. C. Allsop, F. Benzies, G. N. Craythorne, R. E. Davies, W. C. Haddick, H. F. Lock; (Mar. 29) L. W. Cutler, W. McL. Dewar, W. D. Mackenzie, C. Nowell; (Mar. 31) P. Fish, J. M. Howells, R. A. Lyon, H. W. Stoddard, W. R. Wakefield, E. W. Webb, J. Williams; (Apr. 1) H. C. Allen, J. S. Bradley, W. B. Giles, R. G. Norman, N. Salmon; (Apr. 2) P. Brown, E. V. G. Chalmers, H. Fairhurst, L. R. Parratt, S. W. F. Wheatcroft; (Apr. 4) C. A. Anderson, T. F. Taylor; (Apr. 5) F. B. Waterfall; (Apr. 6) R. H. Browne; (Apr. 7) H. S. Evans, A. Gibbon, C. Heslin, T. Johnson, R. F. Kennedy, F. W. Lindgren, D. G. H. Meade; (Apr. 8) E. F. Barbanel, V. Cleaver; (Apr. 9) F. J. de la Motte, A. Dewhirst, E. E. Green, J. Hetherington, J. Kettrick, J. W. Kinnear, A. H. Lawrence, H. Lewis, L. Mason, J. S. Nairn, G. A. Renwick, J. A. B. Short, P. F. Slater, J. M. Southward, F. B. Wesley, L. E. H. Williams; (Apr. 10) T. Bartholomew, A. A. Dalby, W. T. E. Davies, W. A. Evans, A. L. G. Hamilton, M.C., D. Hewitt, H. Lee, C. M. McVay, F. S. Neate, H. Slater; (Apr. 11) H. W. Ash, C. Macguire; (Apr. 12) A. M. Garrington, J. W. Thomson; (Apr. 14) D. A. Gordon, M.M.; (Apr. 15) G. E. Fox, G. W. Neilson, M.M., L. F. Tibble; (Apr. 16) J. M. Edwards, P. W. Goldby, W. Gray, G. W. McNeil, E. G. Randall, J. M. Thomas, G. W. Tullock, G. C. Williams; (Apr. 17) G. W. Blance, H. B. Cook, J. G. Hadden, W. Heald, H. N. Naylor, F. Skidmore; (Apr. 18) W. Hague; (Apr. 19) J. C. Findlay, G. W. Gregory, E. Lightowler; (Apr. 20) D. W. King; (Apr. 21) A. J. Bull, J. G. G. Davies, A. Erskine, C. L. Hall, J. McC. Lee, J. M. Nicholson, H. Redman; (Apr. 22) J. H. Forster, F. J. Kempton, L. A. LeMay, W. A. Ray, G. Worthing; (Apr. 23) C. J. A. Berkeley, J. Lewis, W. Martin, W. A. Thomas, W. R. Watkins; (Apr. 24) W. G. Baillie, G. P. W. Lamb, A. Marenbon, J. C. S. R. Stoneman; (Apr. 25) W. M. Dalton; (Apr. 26) A. Plummer; (Apr. 27) B. Maddock, K. H. M. Richards; (Apr. 28) R. Butler, J. McK. H. Sturrock, L. K. Wilkinson; (Apr. 29) A. Gooch, K. S. Tayler, J. Tuckwell; (Apr. 30) J. R. Fyffe, H. McCulloch, J. R. Paterson, D. A. Ramsay, G. Stewart, D. D. Wilson; (May 1) H. Pollard; (May 6) E. Barlow, R. Hunter, J. P. Robertson, J. Shirlaw; (May 8) D. Mitchell; (May 10) D. W. Cameron; (May 12) A. McKechnie; (May 13) E. C. B. Smith; (May 14) D. B. Cameron, W. Christie, F. Martin.

*Equipment Branch.*

The folg. are granted commns. for durn. as Act. P/Os. on probn. (May 23):—W. Bell, W. Davidson, J. Deans, H. J. J. Evans, A. S. Fitzgerald, J. S. Geary, R. S. Gibbons, J. M. Gosden, K. T. James, J. Jamieson, D. J. Mears, A. W. J. Mursell, F. Price, H. Ritchings, W. J. M. Synge, H. L. Tebbutt, G. F. Whitfield, E. H. J. Wilson.

P/O. on probn. M. Revell is confmd. in his appt. (Sept. 18, 1940) and promoted to war substve. rank of F/O. (Apr. 12).

The folg. P/Os. on probn. are confmd. in their appts. (Apr. 2) and promoted to war substve. rank of F/O.:—(May 13) F. T. H. Anelay, E. C. Bolton, H. Bowman, D. Crabtree, A. H. P. Hollis, L. B. Kingsbury, S. Miller, E. J. Morris, J. R. Pryor, C. H. Skipper; (May 15) P. M. Gilmore; (May 16) E. H. Isaacs; (May 25) E. W. Piggott.

The folg. P/Os. on probn. are confmd. in their appts. and promoted to war substve. rank of F/O.:—(May 22) A. L. Bieber, A. B. Bishop, K. B. Boys, F. Carter; (June 1) H. E. Courtney, I. W. C. Dagworthy; (June 5) A. King, M. E. Longman; (June 10) M. McLeod.

The folg. Act. P/Os. on probn. are graded as P/Os. on probn.:—(Feb. 21) E. H. C. Johnson; (Apr. 4) C. W. J. Clegg-Butt; (May 16) G. H. Bedford, J. McN. Brock, D. W. Burgess, D. G. Cowling, C. S. Crawford, C. D. E. Davis, F. P. Endersby, W. F. Foster, G. F. Gange, F. C. C. Godbeer, H. M. Hutt, M. A. Liddell, R. C. Sandwith, H. J. Shuttleworth, L. J. Titchmarsh, R. B. Waller.

The folg. F/Os. are promoted to rank of Flt. Lt. (temp.):—(Dec. 1, 1940) D. W. Roberts; (June 1) H. J. Lucie-Smith, T. ap Simon.

The folg. P/Os. are granted war substve. rank of F/O.:—(July 15, 1940) E. C. Pointer; (Sept. 17, 1940) R. Todd; (Sept. 22, 1940) D. C. Maurice; (Feb. 1) W. F. Tuckwell; (Feb. 12) D. L. McDonnell.

P/O. on probn. G. B. Warnes is transfd. to General Duties Branch (Nov. 1, 1940).

*Accountant Branch.*

The folg. are granted commns. for durn. as P/O. on probn.:—L.A/C.: (May 21) H. H. Altman. As Act. P/Os. on probn.:—(May 30) G. W. Battershall, C. O. Bird, D. F. D. Cartwright, S. J. Couban, C. H. Duringer, R. E. Frears, V. H. Hunt, K. G. McKinlay, H. T. Needham, N. J. Searle, A. H. Simpson, W. Wilson. Sgt.: D. Kelly. L.A/C.: I. Purdham, C. F. Tomkins, A. M. Struthers. A/C.1: P. Scott. A/C.2: L. S. Canham.

The folg. P/Os. on probn. are confmd. in their appts. (May 18) and promoted to war substve. rank of F/O.:—(June 11) H. M. Tiller; (June 21) M. V. Baxter.

Act. P/O. on probn. F. J. Power is graded as P/O. on probn. (Apr. 19).

P/O. on probn. N. N. Matthews relinquishes his commn. on account of ill-health (June 3).

*Medical Branch.*

The folg. are granted commns. for durn. as F/Os. (May 23):—A. J. Abraham, M.R.C.S., L.R.C.P.; R. T. Bevan, M.B., B.Ch., M.R.C.S., L.R.C.P., D.P.H.; E. FitzG. Burton, M.B., B.Ch.; D. Couesland, M.B., B.S., M.R.C.S., L.R.C.P.; C. B. Grimaldi, B.M., B.Ch.; W. F. Hall, M.B., B.S., B.Hy., D.P.H.; C. MacL. Mackenzie, M.B., Ch.B.; A. W. D. Martin, M.B., B.S.; H. S. Mason, M.B., B.Ch.; D. E. Mitchell, M.B., Ch.B.; D. F. Mungall, M.B., Ch.B.; W. S. Pitt-Payne, M.R.C.S., L.R.C.P., L.M.S.S.A.; H. V. Roberts, M.B., B.Ch.; H. A. Rowley, M.B., B.S., M.R.C.S., L.R.C.P.; D. Salmon, M.B., Ch.B., L.R.C.P. & S.; F. S. Shepherd, M.R.C.S., L.R.C.P.; C. E. Thomas, M.B., B.Ch.; R. A. Trevethick, M.B., Ch.B.; J. Wilson, M.B., Ch.B.; G. P. Wood, M.B., B.S.

The folg. F/Os. are promoted to war substve. rank of Flt. Lt.:—(May 7) N. B. Atkin, M.R.C.S., L.R.C.P.; K. L. G. Nobbs, G.M., M.B., B.S.; (May 14) W. Ingman, M.B., Ch.B.; (May 28) P. G. Todd, M.R.C.P., M.R.C.S., M.B., B.S.; (June 18) G. Fraser, M.B., Ch.B.

**VENTURE ADVENTURE: The badge of the Air Training Corps, in which nearly 200,000 youths have enrolled. It represents a falcon surrounded by a circlet of scarlet surmounted by an astral crown with alternate wings and stars.**

## *Auxiliary Air Force*

*General Duties Branch.*

The folg. P/Os. are promoted to war substve. rank of F/O. (May 27):—G. Buckley, P. Wilson.

F/O. G. C. Hunter is transfd. to Administrative and Special Duties Branch (June 13).

*Balloon Branch.*

Flt. Lt. G. M. Trundle is promoted to rank of Sqn. Ldr. (temp.) (June 1).

*Administrative and Special Duties Branch.*

The folg. are transfd. to Technical Branch:—Flt. Lt.: (Apr. 24, 1940) H. Adams. F/O: (Feb. 12) W. J. S. Mills.

F/O. P. G. M. Hancock takes rank and precedence as if his appt. as F/O. bore date Mar. 3. Reduction to take effect from Apr 29.

## *Auxiliary Air Force Reserve of Officers*

*General Duties Branch.*

F/O. R. A. Chisholm, D.F.C., is promoted to war substve. rank of Flt. Lt. (June 22)

## *Women's Auxiliary Air Force*

The folg. are appointed Assist. S/Os.:—(June 7) Cpl. J. O. Bawden, Cpl. B. J. Harvey. A/CW.1 Hon. F. H. L. M. O'Brien; (June 14) A/CW.1 M. D. Beale, Cpl. N. Y. Beard, Cpl. M. Briercliffe, A/CW.1 S. D. Buchanan, A/CW.2 I. K. Carver, A/CW.1 A. R. Compston, Cpl. M. H. Corrick, Cpl. M. G. Dyce, A/CW.2 O. R. Evans, A/CW.1 M. C. Foxwell, A/CW.1 L. M. Frank, A/CW.1 B. E. S. Miller, A/CW.1 W. LeQ. Mitchell, A/CW.2 P. P. Morphy-Morris, A/CW.1 J. Oatway, A/CW.1 J. C. Rowbotham, A/CW.1 B. C. Threlfell.